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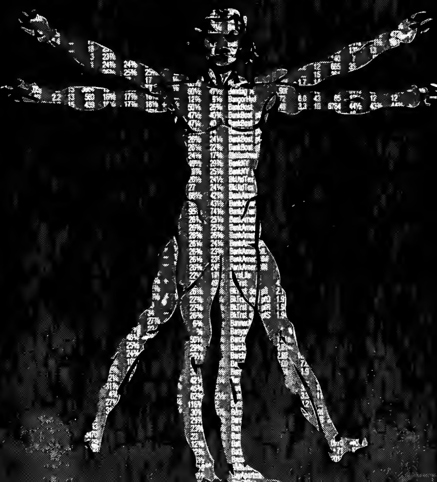

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Measuring What People Know

Human Capital Accounting for the Knowledge Economy

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

This report was undertaken within the framework of a joint activity by the OECD's Education Committee and the Employment, Labour and Social Affairs Committee to investigate the investment nature of further education and training. Based on research intended to study theoretical and practical underpinnings for the economic treatment of skill formation and qualifications of workers, it follows up on earlier work that appeared in *Industry Training in Australia, Sweden, and the United States* (1993), and was a basis for work that appeared in *The OECD Jobs Study: Facts, Analysis, Stategies* (1994), *The OECD Jobs Study: Evidence and Explanations* (1994), and *The OECD Jobs Study: Implementing the Strategy* (1995).

The report was prepared by Mr. Riel Miller of the OECD Secretariat. It is published on the responsibility of the Secretary-General of the OECD.

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EXECUTIVE SUMMARY

This book is concerned with the changing connection between human capital and economic performance. OECD countries are undergoing economic changes with important implications for the ways in which human capital is acquired and used. Exploring these trends leads to an analysis of the information and decision-making systems that shape human capital acquisition and utilisation. In turn, this analysis of the methods and institutions of human capital measurement, accounting and valuation, leads to the conclusion that improvements to these systems are a key factor in helping a nation's firms to compete.

If learning is the main characteristic of social and economic change, then human capital information and decision-making system – the determinants of learning – become central to efforts to cope with change. The need to rethink the way we make choices about the utilisation and acquisition of human capital arises from the profound upheavals taking place in the nature of technology, wealth creation, and employment. In brief, this book attempts to demonstrate that it is time to significantly strengthen in practice the oft-mentioned conceptual parallel between physical and human capital. Readers of the management literature will be familiar with many proponents of treating employees as investments as opposed to costs. Once the shift from cost-to-investment-based thinking is made, it is natural to continue the transition towards full accounting of human capital investments as assets that produce returns over an extended period of time. This book focuses on the conceptual and practical aspects of extending the treatment of physical capital to human capital.

One of the reasons for undertaking this effort to deepen our understanding of how and why we invest and use human capital is that OECD governments are strongly committed to improving the skills of their citizens as one of the principal means for dealing with current economic uncertainty. This commitment poses new challenges to human capital investment. What should we invest in? How do we set the proper incentives? Is there a way to determine the extent of over- or under-investment? Are we making good and efficient use of the existing stock of human resources?

In answering these questions, this volume turns to the insights of three disciplines: economics, accounting, and education. Combining the conceptual and practical successes and failures of these distinct vantage points helps to provide new perspectives on the larger question of how human capital information and decision-making systems must be reshaped in order to reflect today's economic changes. The diversity of institutions and regulations that govern human capital information and decision-making systems in different OECD countries also demands a multi-dimensional theoretical framework capable of encompassing a range of practices, policies and outcomes.

One way of forging the analytical tools needed to understand human capital information and decision-making systems is to examine the theoretical and practical aspects of knowledge production, diffusion and consumption. Recently, economists have exhibited a renewed interest in the analysis of knowledge, from Romer's modifications to neo-classical growth theory to include endogenous technological change and Porter's attention to intangible investment for a firm's competitive success, to new Schumpeterian perspectives on a firm's incentive to train, and the OECD's emphasis on active labour market policies. A similar upsurge is occurring in the work of accountants, grappling with the problems posed by intangible assets, and by educators, reconsidering the definitions and methods of assessment of acquired knowledge/skills.

Spurred by the same unfolding of economic events, policy makers are under intense pressure to assimilate any new insights regarding the role of human knowledge in economic development and respond by implementing the appropriate regulatory and fiscal policies. Taking the policy challenge as a cue, this book considers:

- The reasons for introducing policies that improve the methods used by individuals, firms, and governments for recording the stocks and flows of human capital that result from knowledge investment.
- The implications of changes in human capital information and decision-making systems for labour and capital markets where both the prices associated with specific skills and the willingness to borrow/lend for the acquisition of such skills are determined.

In approaching the economic role of knowledge, this book narrows its focus to the allocative decisions made by individuals, firms and governments to acquire and use human embodied knowledge (knowledge embodied in people as opposed to knowledge embodied in machinery or books). It does not consider a number of related issues such as the learning process per se or research and development activities that are important components of the overall production, diffusion and consumption of knowledge. By situating the discussion of competence on the theoretical terrain of both the economics of knowledge and the decision-making processes determining investment, it is possible to develop a general conceptual framework for assessing human capital information and decision-making systems. Next, proceeding from the theoretical towards the practical, the analysis moves to a consideration of the difficulties confronting efforts to treat training as investment, and the corollary labour force qualifications as assets. Finally, this book concludes with a discussion of the potential benefits and means of improving human capital information and decision-making systems.

Reviewing the steps already being taken by individuals, firms and governments to improve the functioning of human capital markets leads to the conclusion that public policy must focus on the development of better signals for competence validation, valuation, accounting and financial reporting. Embracing a pragmatic approach, the policy directions suggested here build on the emerging new standards and institutions.

"Many of the terms we use to describe the economy today no longer reflect reality. Everybody knows that all the lights would go out, all the airplanes would stop flying, and all the banks and many of the factories would shut down if the computer software that runs their systems suddenly vanished. Yet these crucial intellectual assets do not appear in any substantial way on the balance sheets of the world. Those balance sheets are, however, full of 'tangible' assets – buildings and machinery, things that can be touched. How does a national government measure capital formation, when much new capital is intellectual? How does it measure the productivity of knowledge workers whose product cannot be counted on our fingers? If it cannot do that, how can it track productivity growth? (...) And if it cannot do any of these things with the relative precision of simpler times, what becomes of the great mission of government: controlling and manipulating the national economy? Even if some of these measurement problems are solved, the phenomena they measure will be far more difficult to manipulate than in the industrial economies of old" (Walter Wriston, former Chairman of Citibank).

"The difficulties encountered in trying to treat various forms of intangible investment more rigorously are more than an analytical obstacle to deepening the understanding of the dynamics of economic activity. They are symptomatic of patterns in the established 'rules of the game' by which economic value is determined. To the extent that these 'rules' are being rendered obsolete by technological and social developments, to say nothing of business reality, they distort prices and the allocation of resources" (OECD, 1992*a*).

Part I

DEVELOPING A FRAMEWORK FOR RETHINKING HUMAN CAPITAL INFORMATION AND DECISION MAKING

1

DEFINING THE PROBLEM

Human Capital Decision Making under Changing Economic Circumstances

1.1. CHANGING ECONOMIC CIRCUMSTANCES

Market imperatives are driving the need to rethink the allocative mechanisms that determine the production, diffusion and consumption of knowledge. As firms respond to new technological developments and competitive forces, evidence seems to suggest that investment in human competences is steadily becoming a more significant factor in a firm's competitive success.[1] In a way that evokes the transformation of capital to labour ratios experienced in the transition from agricultural to industrial economies, there is a widespread perception that the knowledge embodied by workers is gradually becoming a larger proportion of the overall productive capacity of the organisation relative to raw materials, fixed capital and even managerial knowledge (Drucker, 1993; Maddison, 1982; World Bank, 1992).

> "Two broad trends can be observed in the development of modern industrialized countries. First the output from the world's science and technology system has been growing rapidly throughout the 1980s. A doubling of the stock of knowledge in seven to ten-year intervals has been common, corresponding to annual growth rates of about 7-10 per cent. Second, the 1980s have seen changes in the nature of investment. The relative proportions of physical and intangible investment have changed considerably. For example, some measures show that total industrial intangible investment had passed physical investment in Germany, Sweden and the UK by 1987. Other evidence of the changing nature of investment is the increased complementarity between physical and intangible investment as well as the high technology content in both kinds of investment. These trends are transforming the structure of productive assets" (Deiaco, Hörnell, and Vickery, 1990, p. 1).

The transformation at the level of the production process has been accompanied by the onset of the so-called productivity paradox: "the seeming contradiction between the perception that technical change has accelerated in the recent decade and the observed fact that productivity growth has not recovered to its average post-World War II levels" (OECD, 1991*a*). In the 1990s, with the onset of recession, rising unemployment, and severe fiscal pressures, governmental curiosity regarding an unexplained productivity paradox has been transformed into a deep concern about human capital and the labour market. Even before the cyclical difficulties of the 1990s, the OECD signalled – both in the Technology/Economy Programme (TEP) literature and the analysis of *New Technologies in the 1990s* (OECD, 1988) – that the socio-technical nature of change at the micro-level would require transformation of the signals that direct investment in human capital.[2]

A Canadian example reinforces the view that new approaches to human capital accounting are needed during a period of transition in the conditions of production.

> "Accounting rules and standards can substantially affect our national prosperity and our quality of life. The competitiveness of Canadian companies – the basis of our national prosperity – can be encouraged or hindered by the (accounting) profession (...) present requirements for external financial statements impede the financing of knowledge-based companies – those that produce high value-added goods and services through the application of science and technology. The statements do not reflect real value for these companies. (...) (Accounting) could make an important contribution by giving formal recognition in financial statements to "invisible capital" that resides in knowledge-based firms" (Brennan, 1992, p. 21).

Yet, regardless of the growing importance of knowledge in production across OECD Member countries, little has been done to accommodate this change in the measurement and pricing of human resources.[3]

There is a need to provide clearer signals in order to facilitate efficient investment and allocation of human resource assets by individuals, firms and governments. There is widespread recognition of the need to transform the incentives for firms to treat investment in human capital as an asset that pays dividends over a long period of time.[4] Similarly, individuals need to be able to see their investments in skill formation as a lifelong commitment to building assets. Governments, faced by budget constraints and growing demands for long term investments in growth-creating infrastructure, are still unsure both about how much and where to invest in order to improve the efficiency of knowledge production, diffusion and consumption. Finally, the importance of better signals for effective and efficient choices in the labour market and within the firm offers good reason to reassess the mechanisms that inform and direct knowledge investment and use (see for instance: Aoki, Gustafsson and Williamson, 1990; Coase, 1988; Demsetz, 1992; Reich, 1992; Storey, 1989). From all of these different vantage points there is a compelling need to rethink human capital information and decision-making systems.

1.2. HUMAN CAPITAL INFORMATION AND THE CONTENT OF ACQUIRED KNOWLEDGE

Economists regularly tackle challenges of this kind by starting from the common sense proposition that effective and efficient investment decision making in both market and non-market conditions depends mainly on the availability of good information. In turn, good investment information depends on the much more difficult task of arriving at an accurate determination, or at least attaching robust estimates, of the probable costs and benefits in both the short and long term. The investor in knowledge acquisition (for example, a student) needs to know the value of the service being offered by the vendor of learning services (for example, a trainer). Naturally, the investor who rents human competences in order to produce something also wants to reduce the risk that the worker may not have the skills required to produce a product that succeeds in the marketplace.

It is at this elementary level that the information and hence decision-making processes in the realm of human knowledge can run into trouble. What are the market values (or more generally, the costs and benefits) of investing in the acquisition of the knowledge offered by a learning service? What is the market reward or output increment attributable to the production, diffusion or consumption of knowledge for the individual, for the firm, and for society as a whole? What competences does a potential employee or a newly trained employee bring to the production process and what is the relationship to productivity growth and competitive success in the product market.[5]

Without good information it is impossible to make efficient investment decisions except by chance. In market economies, financial accounting and reporting systems establish the "rules of the game" for providing information that improves the efficiency of decisions. But the information provided by these systems is far from complete. Because of that and distinct types of market failure (see Chapter 5), economists and policy makers often have difficulty, on the basis of existing information and decision-making processes, in determining if there has been under- or over-investment or efficient utilisation of human capital.[6] Moreover, even though in practice the rates of investment appear to be increasing, little consideration has been given to either the content or the quality of the investments being made in human capital.

This book is concerned primarily with how this latter question influences the subsequent economic decision-making processes. In other words, before debating the rates of return or efficiency of the scale and/or choices of human capital investment it important to ask: what is the investment in? The question of how we measure this investment logically precedes the question of whether or not the investment is efficient or the costs amortized over the period in which the investment pays returns. And, methodologically, the analysis of measurement issues requires prior consideration of the allocative means and objective, *i.e.* who needs the information and what are they going to use the information for? A methodological criterion that applies both to human and physical capital.[7]

The framework developed here will analyse the connections between the relevant decision-making agents and the economic consequences of their decisions. The goal is to tie the economic relevance of human capital accounting to micro-level decisions made by the individuals and firms that collectively determine the evolution of the economy as a whole. This book offers a framework which takes into consideration institutional and historical factors that influence the "treatment" of training and labour force qualifications in financial accounting and reporting systems. Subsequently it suggests policies that could improve the information available for making choices regarding both the acquisition and utilisation of human capital.

The next two chapters provide the definitions, theoretical framework, and empirical categories that are necessary to respond to the policy challenge. With the goal of defining human capital in a way that is useful for an analysis of information and decision-making systems such as financial accounting and reporting, Chapter 2 reviews human capital theory and arrives at a definition that is independent of a number of traditional assumptions. Moving from basic definitions to the aggregate level of analysis, Chapter 3 then develops a framework for analysing human capital information and decision-making systems within the economy as a whole.

HUMAN CAPITAL

Reassessing Prior Theory and Assumptions

> "The connection between knowledge and human capital is easily understood if one realizes that capital is formed by investment, that investment in human resources is designed to increase their capacity (to produce, to earn, to enjoy life, etc.), and that improvements of capacity, as a rule, result from the acquisition of 'knowing what' or of 'knowing how'" (Machlup, 1984, p. 8).

There is a significant body of literature and debate surrounding the analysis and measurement of human capital[8]. An in-depth survey of the wide range of specific issues raised and progress made in the human capital literature is secondary to the main task of this book. However the various definitions of human capital will be briefly explored here in order to narrow the issues under discussion and provide a starting point for the subsequent analysis of the economic role of financial accounting and reporting of training and labour force qualifications.

2.1. A BRIEF REVIEW OF HUMAN CAPITAL THEORY

Launched in the late 1950s and early 1960s by Schultz, Becker and Mincer, the first generation of human capital theory reached its apogee by 1970 (Blaug, 1985). The second generation worked hard throughout the 1970s to demolish much of the first generation's optimistic and perhaps simplistic verification that investment in human capital does pay off because the correlation between years of schooling or on-the-job training and income demonstrates that there is a positive rate of return. Recently, a new series of studies have once again applied rate-of-return analysis to the assessment of human capital, providing grounds for what might be called a third generation of human capital analysis.[9]

Since the initial studies attempted to assess the relationship between education and income, there has been little doubt that there is a strong correlation. However, as with all probabilistic methodologies, the causality remains uncertain. The connection between educational attainment and income distributions turned out to be much more non-linear, segmented, and qualitatively discontinuous than human capital theory initially allowed for. As Blaug puts it: "If we now add together the vital 'socialization' function of schools, the 'screening hypothesis' in the sense of statistical discrimination, the concept of the 'incomplete' employment contract, the phenomenon of 'internal labour markets' and the notion of labour market 'segmentation', we arrive at a picture of the economic value of schooling that is simply miles removed from the old-fashioned belief that education makes workers more productive and that employers pay them more because they are more productive" (Blaug, 1985, p. 25). And, as Eliasson notes "(...) the market for labour or rather competence is extremely imperfect, a circumstance that invalidates a large part of the traditional human capital literature" (forthcoming, 1996). Subsequently, a wider range of causal factors, including different types of training and firm-based internal labour markets, have been introduced in order to help explain the returns to investment in human capital without, however, adequately overcoming the basic "black box problem" of uncertainty surrounding the process by which human capital is transformed into output.[10]

Many studies admit there is considerable uncertainty about whether or not "experience-earnings differentials can be explained by experience-productivity differentials" (Abraham and Medoff, 1981, p. 215). Although there is indirect evidence "that wages increase with tenure primarily because productivity increases with tenure" (Brown, 1989, p. 990), there remains the basic difficulty of ascertaining the productive capabilities of workers (Barron, Black and Loewenstein, 1987) or the contribution of incremental learning to productivity (Bishop, 1991).[11]

A second basic impediment to establishing the causal link essential to traditional human capital theory is the difficulty of ascertaining the degree of skill, knowledge and work effort that a worker actually possesses or might acquire through experience or training. Usually education certificates are used to measure actual competences. But these achievement certificates are imprecise at best. This aside, there is the more general problem of validating experiential learning that takes place outside of education institutions. Human capital theory has consequently faced a dual empirical challenge on the input and output sides of the knowledge production function.

The combination of these empirical difficulties and the tendency in human capital literature to focus on rates of return led almost inevitably to a somewhat narrow definition of both the knowledge embodied in people and its economic role. To understand the role and utility of financial accounting and reporting of training and labour force qualifications, it is important to begin with a more theoretically open definition of human capital. In this sense, the definition proposed in this volume emerges in a methodologically consistent way from the consideration of the use to which the term will be put. The emphasis here is on the micro-level economic decision-making and information systems that underpin macro-performance, not estimates of rates of return or investment.

2.2. KNOWLEDGE AND THE MEASUREMENT OF HUMAN CAPITAL

Identification of the types of benefits associated with different types of investment in knowledge, does not necessarily provide a clear basis for calculating the expected return. For example, improving the technical capacity of a widget-making machine by investing in greater knowledge (R&D, design improvements, etc.) that is then embodied in the widget machine is amenable to clear and unambiguous quantitative measurement. In this case the improvement to the widget machine that increases its output from 100 widgets per hour to 200 widgets per hour does provide a clear, measurable output-based return on the investment in more machine-embodied knowledge. When and if the widget is sold, the financial return on the investment can be established.

When it comes to assessing the returns on human capital investment, the process breaks down at the very first step of establishing some measure of the individual's knowledge.[12] There are currently few methods for accurately measuring either the existing capacity of an individual's knowledge or the increase in the productive capacity due to the knowledge acquired by investing in additional competences. This stumbling block to the valuation of human capital has provoked analysis and debate in the economic literature.

There are three common ways of measuring human capital. One is to look at the cost of acquisition of certified knowledge, that is, the cost of formally recognised schooling and training. The second method is to test people for their competences. And the third method involves estimating productivity based on "achievement" indicators, such as a person's income level, job security, occupational status, and past references.

The first measure, depending on the nature of the schooling and certification system, usually tells only a bare minimum about the knowledge actually absorbed by the individual due to the investment. In most countries, a large proportion of diplomas, degrees and other certificates are fairly general in nature and often fail to provide any precise assurance of particular competences (OECD, 1989, pp. 34-35). The second measure – testing – is often subject to significant uncertainty as to its validity, rigidity, inconsistency, inequality, and conflicts of interest.[13] In addition, as will be seen in Chapter 6, even though assessment methods are evolving rapidly most are still in the early stages of development. As for the third method for measuring the results of human capital investment, its accuracy depends on accepting the assumption that competence is accurately reflected by labour market status. This means that without directly measuring the knowledge actually acquired through human capital investment, it is assumed that current labour market status accurately reflects the value of human-embodied knowledge, if not the content. In effect, this last method does not attempt to measure the specific productive content or capacity of the embodied competence since it is simply assumed that labour market outcomes are correlated with skill differences. Even if this assumption is accepted, it does little to satisfy the interest in the content or capacity of an individual's specific human capital. Assigning a monetary value to the output of a production process does not reveal the particular attributes of the inputs to production – steam or electric engine, master craftsperson or apprentice. From a transactions perspective it is perfectly reasonable to be concerned only with what the market will bear. But looked at in terms of how to improve content or engineering choices, it becomes essential to clarify both specific competences that make up human capital and the links between capacity and monetary compensation.

Considerable work has been done on the basis of the first and third measurement methods to estimate the returns to human capital investment on a cost and earnings return basis (see the human capital literature cited in the previous section). However, little consideration has been given to the second measurement method and the potential economic utility of finding comparable and reasonably inexpensive ways to assess competence associated with acquired human capital. Depending on the country and industry, competence-based measures are operative to a greater or lesser extent within firms, sectors and specific crafts. Where more transparent human capital information and decision-making systems operate, they tend to standardize skill content in ways that create transparent incentives for knowledge utilisation and acquisition. National and firm-specific examples have shown the benefits of validating competences through transparent assessment and validation mechanisms.[14] Systems that come closer to approximating the greater certainty associated with the output specifications of physical capital are better able to provide standards allowing verification of the relationship between inputs and outputs (Benston, 1970; Flamholtz and Lacey, 1981). This, in turn, has a positive impact on the ability of firms to refine the production process in order to produce competitive products at acceptable rates of return.

From this perspective, measurement of the productive potential of human capital is one of the primary building blocks of a conceptual framework capable of linking human capital to more efficient and sustainable economic activity.

2.3. RETHINKING THE DEFINITION OF HUMAN CAPITAL

Human capital is defined here as the knowledge that individuals acquire during their life and use to produce goods services or ideas in market or non-market circumstances.[15] This definition is rooted in an attempt to reveal the basic role of information in making decisions regarding the acquisition and utilisation of human embodied knowledge. The starting point is the productive utility of human knowledge, particularly since, in the end, financial accounting and reporting are meant to provide information regarding the actual outcomes of firm and individual economic activity. Instead of starting out from where the data exists in the hope of finding a way to explain economic events, the definition of human capital used here ignores the source of knowledge acquisition (formal or informal, family or school, job or leisure) and disregards for theoretical purposes both the specific nature of the competences acquired (cognitive or behavioural, technical or team-oriented) and the method for certifying or validating the actual acquisition of specific competences (test or prior work, testimonial references or actual job performance).

This abstract definition of human capital, by remaining agnostic about the source, nature or validation of embodied competences, helps to focus on two issues: *i)* the productive capacity arising from knowledge, and *ii)* the utility of improving the methods for assessing the productive capacity of human capital. As a result it becomes possible to address two of this book's main goals. First, it is possible to clarify the general economic utility and potential of improved human capital financial accounting and reporting systems. Second, by suspending the assumption about the content of human capital it becomes possible to consider methods for revealing that content in ways that may be more relevant and efficient for the emerging knowledge-based economy.

The apparent contradiction between the abstract definition of human capital as productive capacity regardless of its origins and the practical concern with measurement is resolved if one starts with an open conception of measurement. Defining human capital as productive capacity makes it possible to establish methods for measuring human capital in a systematic and independent fashion. By combining the abstract and the practical, this definition is more akin to the engineering approach to the output potential of a machine, independent of the financial analyst's concern about the higher collateral value of brand name equipment (or the source of a person's degree, *e.g.*, Harvard) or a manager's worries about demand conditions for the final product (or a person's prospect of employment in their field of specialisation). By defining human capital in a way that is independent of its inputs and of its rate of use, the analytical starting point shifts towards the "embodied capacity" first (skills and competences that an individual has acquired), and then proceeds to the consideration of how embodied knowledge is measured, valued and accounted for in the labour and capital markets.

HUMAN CAPITAL ALLOCATION DECISIONS

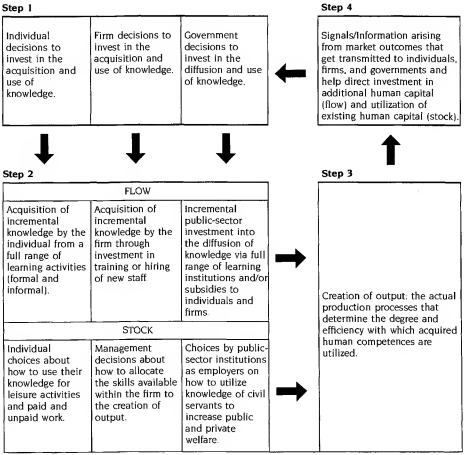
The Distinction Between Acquisition And Utilisation of Embodied Human Competences

When learning becomes a "permanent" activity for firms and individuals, human capital allocation decisions are more complex. Formerly simple decisions by employers to hire or individuals to go to school are complicated by a much greater range of options and market implications. Jobs are being constantly transformed in ways that alter human capital requirements. This in turn changes hiring and training decisions. Looked at from the perspective of human capital, it is important to distinguish two basic areas of decision making. One is the allocation, primarily within the firm, of existing skills to particular tasks. Firms decide what to do with an existing stock of human capital (either already on payroll or available for hire). The second main area of human capital decision making involves the allocation of resource towards the acquisition of productive skills. Decisions to invest in the flow of human capital are made by a wide range of economic agents. As continuous learning – both on and off the job – plays an ever greater role in competitive success, it becomes simultaneously more difficult and important to make good allocative decisions about the stocks and flows of human capital.

Allocation theory typically applies to a world where the assumptions of perfect information and its fully rational use prevail. In the real world, where these assumptions do not hold, it is essential to understand how and if information is actually produced, embodied, transmitted and acted upon. From this perspective, improving the allocative efficiency of decisions concerning the stocks and flows of human capital will not be a trivial task. Many years were required to build up the conventions and institutions for evaluating and recording the value of physical capital. The challenge for human capital – of achieving both the greater accuracy and transparency of the relative prices upon which allocative efficiency depends – will also represent a significant effort.

Chapter 3 takes one step towards meeting this challenge by sketching the contours of a human capital decision-making framework. Diagrams 1, 2 and 3 serve to highlight the diversity and richness of the information and interactions that

Diagram 1. **Circuit linking the stock and flow of embodied knowledge to production and decision making**



Step 1

Individual decisions to invest in the acquisition and use of knowledge.

Firm decisions to invest in the acquisition and use of knowledge.

Government decisions to invest in the diffusion and use of knowledge.

Step 2

FLOW

Acquisition of incremental knowledge by the individual from a full range of learning activities (formal and informal).

Acquisition of incremental knowledge by the firm through investment in training or hiring of new staff.

Incremental public-sector investment into the diffusion of knowledge via full range of learning institutions and/or subsidies to individuals and firms.

STOCK

Individual choices about how to use their knowledge for leisure activities and paid and unpaid work.

Management decisions about how to allocate the skills available within the firm to the creation of output.

Choices by public-sector institutions as employers on how to utilize knowledge of civil servants to increase public and private welfare.

Step 3

Creation of output: the actual production processes that determine the degree and efficiency with which acquired human competences are utilized.

Step 4

Signals/Information arising from market outcomes that get transmitted to individuals, firms, and governments and help direct investment in additional human capital (flow) and utilization of existing human capital (stock).

Source: R. Miller for the OECD.

Diagram 2. **Signals for physical capital decision making**

<table>
<tr><th>Decisions on:</th><th>Individual
(Household)</th><th>Firms
(Production)</th><th>Public Sector
(Producing service or infrastructure)</th></tr>
<tr><td>Utilization of the stock of physical capital</td><td>Quantitative productive capacity, cost of utilization, and estimated rate of return.</td><td colspan="2">⟶</td></tr>
<tr><td>Acquisition of physical capital</td><td>Quantitative productive capacity, costs of acquisition and utilization, and estimated rate of return.</td><td colspan="2">⟶</td></tr>
</table>

Source: R. Miller for the OECD.

Diagram 3. **Signals for human capital decision making**

Decision on:	**Individual** (Knowledge/Competence)	**Firms** (Skill management and acquisition)	**Public Sector** (Human capital spending)
Utilization of the stock of human capital	Labour market signals: income, job security, etc. Values and culture of the workplace. Work patterns over lifetime, work-leisure trade-off.	Hiring, accounting and personnel systems. Engineering studies and managerial practices, labour relations, sunk costs.	General infrastructure investment strategies. Technical and political debates about use of resources, labour market planning.
Incremental investments in the acquisition of human competences	Labour market signals: income, job security. Values and culture of work. Work experience. Costs and returns.	Costs of and returns to the investment as determined by internal firm strategy, human resource policies and public policies. Train or buy. Labour-capital complementarities. Business strategy.	Various signals emerging from firms, individuals, and electoral constituencies; comparisons with other countries, firms, individuals. Analytical studies.

Source: R. Miller for the OECD.

characterise human capital decision making. The aim is to summarise in schematic terms the many information sources and decision making sites, from accounting systems and evaluation schemes to labour and capital markets. The schema presented in this section are one way of revealing the attributes of human capital information and decision making processes. These frameworks help to situate the role of financial accounting and reporting of human capital in the quest for better allocative efficiency. These frameworks reveal the potential of human capital accounting to act as a stepping stone towards providing the information transparency and certainty upon which efficient decisions depend.

3.1. THE INFORMATION CIRCUIT – A SCHEMATIC LOOK AT HUMAN CAPITAL DECISION MAKING

Perhaps the most straightforward way to think about Diagram 1 is to consider the example of the historical impact of the decision to introduce universal and compulsory schooling which provided workers and citizens with basic levels of literacy, numeracy, and industrial/urban behaviour. The educational reforms and institutions put into place as the era of manufacturing replaced rural/agricultural societies helped to clarify and formalize the signals in each step depicted in Diagram 1. Decisions by individuals, firms and governments were significantly altered by the introduction of an entirely new system for establishing and validating certain key competences. These signals then reinforced and facilitated changes in the patterns of investment (flow) and use (stock) of both human and physical capital.

In Step 1, decisions are made by individuals, firms, and governments. In Step 2, production takes place using the human capital acquired through learning or hiring (flow) and existing knowledge (stock). These economic activities generate real output in Step 3 where the productive impact of knowledge is embodied in goods or services. Step 4 is where transactions (market and non-market) give rise to signals that do or do not validate the decisions taken in Step 1. Thus the information circuit is closed and the decision-making/signalling process begins all over again.

Another example of how this circuit works is a management decision to invest in worker training. In Step 1, managers in a firm decide to invest in the acquisition of new competences by directing workers to undergo training. This decision usually reflects a fairly complex and risk-fraught calculation using information from Step 4 about the incremental productive capability that will ensue from a worker acquiring new knowledge (or motivation). This productive increment is then set against the various costs (alternative costs such as hiring someone who is thought to have the skills the worker being trained still needs to acquire) and risks (*e.g.*, of production ceasing due to the firm going out of business or the worker being fired or quitting, etc.). The degree of risk and complexity actually involved in making this specific training decision is strongly influenced by the quality of the human capital information and decision-making system in place. The quality of this system will vary enormously between firms and across countries (see Chapter 6).

Once the investment is made in Step 2 (a flow of capital is now added to the stock), the next stage, a decisive one, is the use of the acquired skills in production. There are many complications involved in putting theory or skills (knowledge) into practice (production), such as disruptions in the technical or psychological conditions of work due to management/labour discord. However, in the long run, the positive effects of upgrading workers' skills is reflected in productivity improvements. The result of this production process then emerges onto the market in Step 4, where the final verdict is rendered in terms of the sale quantities and prices that allow rates of return on investment to be calculated. It is also worth noting that within the firm there can also be non-market, non-output related validation of work performance through appraisal systems (see Chapter 6).

The decision-making schemas presented in this section indicate different stages in the use and creation of the information needed to make decisions regarding human capital acquisition and utilisation, and draw parallels with decision making regarding allocation of resources for physical capital. By sub-dividing the processes of creating signals and using them, it is possible to pinpoint where the different impediments to effective and efficient acquisition and utilisation of human capital might lie. Chapter 5 explores the obstacles to improving the quality of information in the circuit of human capital information and decision making. In this way it is possible in Chapter 6 to begin isolating various policies that improve the transparency, cost and accuracy of human capital information and decision making.

3.2. DISTINGUISHING PHYSICAL AND HUMAN CAPITAL DECISION MAKING

At the moment, in most OECD countries, there is a fairly stark contrast between the diversity of the signals that influence human capital utilisation and acquisition and the more homogeneous and transparent information used to make decisions regarding investments in physical capital. This contrast is illustrated, in simplified form, by the differences between Diagrams 2 and 3 which present the different types of signals/information facing individuals, firms and governments when trying to make decisions about the use of existing stocks and acquisition of additional human capital. In relationship to the overall circuit depicted in Diagram 1, the different cells contained in Diagrams 2 and 3 relate to the point where decisions are made (Step 1) using the information emerging from market and non-market transactions (Step 4) and then determining action in terms of the stock and flow of human-embodied knowledge (Step 2).

Diagram 2 shows the types of signals (estimates of output, cost, and revenue or benefit), used by individuals, firms and governments when making choices regarding the use and acquisition of additional physical capital. At this general level, the signals used are all the same, whether the issue is to purchase/operate a dishwasher or to purchase/operate a new oil refinery. As a standard accounting textbook explains:

> When an organisation purchases a fixed asset, it makes an investment. The organisation commits funds today in the expectation of earning a return on those funds over some future period. (...) In the case of a fixed asset, the future return is in the form of earnings generated by profitable use of the asset. (...) When an organisation is considering whether or not to purchase a new fixed asset, the essential question is whether the future cash inflows are likely to be large enough to warrant making the investment" (Anthony and Reece, 1983, p. 752).

The same textbook explains that "assets are economic resources controlled by an entity whose cost at the time of acquisition can be objectively measured" (*ibid.*, p. 36). At this elementary level it is fairly straightforward to compare the expected flows of expenditures with revenues and determine whether the estimated rate of return is higher than alternative uses of an existing asset or the purchase of a new asset. And, as the accounting and corporate finance literature make clear, there are sophisticated techniques and institutions available (accounting and engineering firms and standards, etc.) to assist with estimation and valuation of an asset and its potential income stream. The intention, in Diagram 2, is to summarise the common methodology, if not techniques or institutions, used by individuals, firms and governments when making decisions about using or investing in a tangible object (a home, a factory, a highway).[16]

Objections to depicting the decision about how to use or invest in physical assets as such an austere and allocatively simple process are amply confirmed by both decision makers and every day experience. Everyone knows that, for instance, purchasing or using a fixed asset like a computer is subject to a lot of uncertain factors such as technological change, future interest rates, future resale value of the equipment, software bugs, failure to meet performance expectations, etc. The point of Diagram 2 is not to pretend that these economic uncertainties do not exist, but to emphasize the extent to which the institutions and techniques used to determine physical capital utilisation and investment provide vast amounts of information and well-established accounting methods.

The advantages a decision maker has regarding investment in physical assets is that accounting, engineering and financial analysis, standards conventions and valuation institutions already exist. These information and decision-making systems, usually defined by a nation's particular legal and organisational traditions, are what makes cost accounting and the calculation of a project's net present value possible. The accounting literature provides ample evidence of the role of laws, regulations, convention and professional standards in setting the definitions and methods of formal accounting and reporting (see for instance Cortese, 1989;

Flamholtz, 1989; Gleeson, 1975; Maunders, 1984; Larsen *et al.*, 1984; National Association of Accountants, 1986). The contrast between Diagrams 2 and 3 is in terms of the quality of the information and methods available for decision making. In most countries/industry sectors and circumstances, choices concerning physical capital are considerably more transparent and explicitly consistent with the concept of inter-temporal costs and benefits than decisions about human capital investment.

With regard to physical capital, present and future benefits are made comparable through the use of discount rates, while costs are measured through depreciation. In the case of human capital, there is no way of counting costs or benefits over any period of time except in the immediate accounting period.

Diagram 3 only begins to hint at the real-world complexity and diversity of the signals and methods that characterise human capital decision making across OECD nations. In contrast to physical capital, there are considerable differences in terms of both the methods and information available for making choices about the acquisition and use of human capital across the spectrum of relevant decision-making agents and situations. Economic uncertainty, which characterises all choices about how to use or invest in "assets", is exacerbated in the case of human capital. The task in Part II of this book is to explore some of the reasons why human capital information and decision-making systems are subject to greater uncertainty and to consider some of the advantages and methods of improving the signals that guide acquisition and use.

Part II

RETHINKING HUMAN CAPITAL INFORMATION AND DECISION MAKING

Recent Developments in the Measurement, Accounting, and Market Recognition of Competences

INTRODUCTION

Part I of this book focused on defining and identifying the economic role and contours of human capital information and decision-making systems. Part II builds on this theoretical framework to begin analysing the obstacles associated with the measurement, accounting and market recognition of human competences. Part II looks at the different factors that shape and inform human capital decision making, from strong public good attributes of human capital and uncertain measurement of human-embodied knowledge to the imperfect and segmented competition that influences signals in the labour and capital markets. Using the theoretical and analytical insights of three disciplines – economics, accounting and education – Part II sheds light on new developments in human capital information and decision making.[17]

A useful, somewhat traditional approach to analysing the functioning of human capital information and decision making is to start with the currently dominant institutional framework for learning acquisition (elementary and secondary schools, universities) and distinguish between initial education and training (IET) and further education and training (FET). Distinguishing initial education and training and further education and training can be done quite effectively on the basis of three criteria: *i)* learning objectives, *ii)* timing and flow of economic benefits, and *iii)* setting.

Another way of approaching the analysis of human capital information and decision-making systems is on the basis of the quality of the signalling and negotiating mechanisms. This goes beyond the market versus non-market dichotomy to an industrial organisation type of distinction based on the degree of transparency and certainty surrounding human capitalisation and acquisition decisions. From this vantage point, it is the quality of the implicit and explicit signals and contracts (and the regulations and institutions that govern such signals and contracts) that distinguishes one firm or labour market from another and helps to explain why non-monetary attributes like job and income security play a role in determining firm performance (OECD, 1993*a*).

The emphasis on one analytical approach over another largely depends on whether the focus is on the supply or demand side of the human capital equation. On the supply side it is natural for the analysis to begin with the differences that distinguish sources of knowledge acquisition, such as experience and compulsory schooling or apprenticeship and post-secondary off-the-job skill upgrading. On the demand side, at the micro-economic level, the analysis of human capital information and decision making logically starts from the decision-making agents and their objectives, *i.e.*, the search by individuals and firms for greater clarity and certainty regarding both the content and returns of investing in human capital. In this sense, the micro-level demand for specific human capital depends in large part upon the expectation that the skill to be acquired or used will actually generate the expected output.

Regardless of which side of the equation is being analysed, measurement and validation methods are fundamental. On the supply side, most OECD countries are engaged in efforts to improve the quality of initial education and training (IET) and FET through better assessment and comparative measurement of learning methods and achievement. The emphasis in this book is less on how to improve the way knowledge is imparted and more on the information shaping the allocative choices driving the demand for knowledge. At this micro-economic level, it is financial accounting and reporting practices that play a fundamental role – by omission or commission – in the decisions that determine individual and firm-based demand for new and existing human capital. Financial accounting and reporting practices (as enshrined in tax law or financial reporting requirements, etc.) are the common foundation for the micro-level decisions that shape human capital supply and demand. This means that a necessary though not sufficient condition for better human capital allocation is progress at the practical level where individuals, firms and governments engage in financial accounting and reporting of training and labour force qualifications. Concentrating here on how expenditure and revenue (which are the costs and benefits of investment streams) are recorded, highlights both the previously discussed asymmetrical treatment of physical and human capital and the challenges of quantification that are discussed in the following chapters.

Part II explores how improvements to measurement, accounting and market recognition of human capital, involving better financial accounting and reporting, lead to greater transparency in the implicit and explicit prices and contracts that determine and connect the supply and demand sides of human capital investment. Chapter 4 situates financial accounting and reporting practices, training and labour force qualifications within the broader context of human capital information and decision-making systems. Chapter 5 then focuses on the theoretical and practical obstacles to improving financial accounting and reporting of training and labour force qualifications.

Chapter 6 surveys a number of examples of initiatives in OECD countries that are indicative of the trend towards improving human capital decision making through better methods and institutions for measurement, accounting, and market recognition of training and labour force qualifications. Chapter 7 outlines a few policy directions and examines a number of the potential benefits for human capital information and decision-making systems stemming from improvements to financial accounting and reporting of training and labour force qualifications.

HUMAN CAPITAL MISINFORMATION

Current Practice in Financial Accounting and Reporting of Training Costs and Labour Force Qualifications

> "Nationally-based accounting standards provide the vital framework in which the financial dimensions of enterprise activity and well-being are defined and measured. But shortcomings can have profound and far-reaching consequences for the kinds of data that firms collect for statistical reporting purposes, tax reporting purposes (reporting income, deductions against income, and capital gains and losses), and for preparing balance sheets (profits, losses, assets, liabilities) for investors and lenders" (OECD, 1996).

Following the general discussion of human capital information and decision-making systems in Part I, this chapter narrows the scope of analysis to the financial accounting and reporting of training and labour force qualifications. The basic rationale, for focusing on the financial accounting aspects of human capital information and decision-making systems is that it determines how training costs and workforce qualifications are treated relative to tangible investment costs and tangible assets. As such, financial accounting and reporting systems play a pivotal role as both an incentive and a source of improved signalling for the acquisition and use of human capital. Financial accounting and reporting is the pre-eminent way of recording the investment choices made by individuals, firms and governments with respect to the acquisition and use of human capital.[18] Without a sanctioned or generally accepted financial record, the costs and benefits of human capital acquisition and utilisation cannot become fully transparent and predictable elements of monetary transaction-based information and decision-making systems. Accounting conventions and methods become particularly important when the goal is to take into consideration the inter-temporal nature of investment. Simply put, an asset – physical or non-physical – does not exist from a transaction perspective without some way of recording the fact that the asset acquired in one period generates revenue in future periods. Accounting is the way to engage in inter-temporal calculation. In a system of accrual accounting the accountants "record the prospect of future cash inflows as an increase in assets and as revenue whenever they have objective evidence of the future cash receipt. (...) Revenue is recorded when realised and expenses are recorded when incurred, without regard for the time of cash receipt or payment. The focus of the accrual basis of accounting is on the realisation of revenue, the incurrence of costs, and the matching of revenue realised with the costs expired (expenses). Adopting the assumption that revenue is recorded when realisation occurs and the related assumption that costs contributing to the realisation of this revenue can be traced through the earnings process requires the use of an accrual-deferral system of accounting" (Larsen *et al.*, 1984, p. 29).

The definitions of financial accounting and reporting, and of training and labour force qualifications, fit within the two axes that set the parameters for this study: *i*) the decision-making agents (individuals, firms, government), and *ii*) the information and decision-making systems used by these agents to decide on human capital use and acquisition in the monetary economy. The term "financial accounting and reporting" is meant to encompass the full range of monetary measures of the value of acquired knowledge used by individuals, firms and governments. As regards the phrase, "training and labour force qualifications", the definition adopted here is narrower than all forms of human capital (knowledge applied, for example, to leisure pursuits or household activities, is thus excluded) but broad enough to encompass the various forms of acquired cognitive and behavioural knowledge that are used in the workplace. (*Note*: for the sake of style and convenience unless otherwise specified, the term human capital is henceforth used interchangeably with the narrower subset of workplace-relevant competence assets described by the phrase "training and labour force qualifications".)

Preoccupation with the monetary dimensions of human capital is not intended to deny the intrinsic, non-monetary importance of many forms of knowledge acquired in daily life. Nor does the recognition of the role of formal financial accounting and reporting diminish the relevance of non-monetary implicit contracts and behavioural norms. However, at the level of inter-temporal human capital investment decision making, it is the treatment under financial accounting and reporting practices, of the inter-temporal value of training and labour force qualifications, that either confirms or denies the outcome of the investment decisions.

Diagram 4 helps to reveal the actual and potential role of financial accounting and reporting of the costs and benefits of knowledge acquisition. Along the horizontal axis are the three principal decision-making agents: individuals, firms and the government. Along the vertical axis are five sources of knowledge acquisition: compulsory education, post-compulsory higher education, public further education and training, firm-sponsored training, and informal learning.[19] This diagram depicts only the flow part of human capital information and decision making since the second axis is exclusively concerned with the acquisition of human-embodied knowledge, *i.e.*, incremental investments.[20]

Diagram 4. **Costs and benefits to individuals, firms and governments of investment in human competences flow by source of knowledge acquisition**

Source of knowledge acquisition	Individuals		Firms		Public Sector	
	Costs	Benefits	Costs	Benefits	Costs	Benefits
Compulsory school	Taxes, fees.	Welfare of young people, future productive and social capabilities.	Taxes.	Cognitive and behavioural skills of workers.	Public expenditure.	Cumulative improvements in productivity, social cohesion, and the tax base.
Post-compulsory higher education	Foregone income/tuition and expenses.	Future earnings, job security, employability, job quality, quality of life.	Taxes, direct financial contributions/ investments.	Improved cognitive and/or behavioural attributes of workers.	Public expenditure	Cumulative improvements in productivity, social cohesion, and the tax base.
Public further education and training	Foregone income/tuition and expenses.	Future earnings, job security, employability, job quality, quality of life.	Taxes, direct financial contributions: investments.	Improved cognitive and/or behavioural attributes of workers.	Public expenditure.	Cumulative improvements in productivity, social cohesion and the tax base.
Firm-sponsored training	Zero to total cost depending on terms of contract.	Future earnings, job security, employability, job quality, quality of life.	Zero to total cost through taxes, tuition, wages paid.	Firm-specific knowledge improves productivity, quality.	Zero to full subsidy	Cumulative improvements in productivity, social cohesion and the tax base.
Informal learning	Opportunity costs and incurred expenses.	Economic and non-economic gains depending on type of skill and validation.	Cost of lost production time due to learning and teaching.	Firm-specific knowledge improves productivity, quality.	Zero.	Cumulative improvements in productivity, social cohesion and the tax base.

Source. R. Miller for the OECD

Diagram 4 draws attention to the areas in which financial accounting and reporting might provide information to connect demand for knowledge (individuals, firms and governments) with the sources of knowledge acquisition (supply). Clearly not all of the cells in the matrix are amenable to quantitative assessment, nor should they be. For instance, it is common practice in most countries, industries and firms to make budgetary decisions on funding for compulsory schooling based on the assumption that the social and economic benefits outweigh the costs. However, in many areas this lack of measurement and accounting seems to be changing as the requirements of the knowledge economy increase the pressure to improve the effectiveness and efficiency of human capital information and decision making. Accommodating these pressures with better measurement and record keeping does not imply that those dimensions of learning that cannot be assessed are valueless. On the contrary, attempts to evaluate and account for human capital should help to overcome some of the neglect and misallocation that is prevalent today.

The analysis presented here takes a step in that direction by focusing on the financial accounting and reporting of those costs and benefits associated with the application of human capital to production. Concentrating on production and the workplace in particular does not significantly reduce the number of unknowns depicted in Diagram 4, but it does direct attention to the financial accounting and reporting of human capital in the labour market.

The feasibility and extent of financial accounting and reporting of the costs and benefits of training and labour force qualifications by individuals, firms and government varies considerably across nations. In general, however, most OECD countries do not provide formal recognition of human capital as an asset in financial accounting and reporting systems at any level. For individuals this means that, beyond the conventional certificates of human capital acquisition, it is difficult to establish readily accepted records of the asset value of their skills. For firms there is the ongoing dilemma that pits cost reduction to improve the balance sheet against the need to spend money to acquire and use labour competences to increase future competitiveness (Caspar, 1989). Governments are similarly torn by the conflicting imperatives of cost reduction to improve operating deficits and public pressure for greater expenditure on education and training infrastructure. Diagram 4 helps to reveal the limited capacity of present systems for financial accounting and reporting to make the costs and benefits of training and wage force qualifications fully transparent and amenable to inter-temporal financial assessment for all three sets of decision-making agents.

Diagram 4 also highlights the extent to which the information – quantitative or qualitative – available for assessing these costs and benefits is dependent on the institutional and regulatory systems in place in the firm and society as a whole. The diversity of approaches across OECD countries toward financial accounting and reporting of training and labour force qualifications by individuals, firms and governments indicates, in part, the distinctiveness of each nation's human capital information and decision-making system. This heterogeneity and relatively underdeveloped status of the formal human capital accounting conventions in OECD countries, suggests that there may be significant obstacles to undertaking financial accounting and reporting of training and labour force qualifications. The next chapter analyses a range of real and potential obstacles to the financial accounting and reporting of training and labour force qualifications.

OBSTACLES TO THE MEASUREMENT, ACCOUNTING, AND MARKET RECOGNITION OF HUMAN CAPITAL

> "The valuation of all assets is a subjective process – especially for intangible assets, when there is often no active open market. Given the subjectivities involved in such circumstances, adequate guidelines and standards are required regarding valuation criteria, methods and disclosures, and the qualifications of valuers. Such guidelines and standards will inspire greater public confidence than hitherto in the reliability and consistency of intangible asset valuations for financial reporting purposes" (Arthur Andersen and Co., 1992).

Economic theory has traditionally identified two major obstacles to improved human capital information. One is the so-called intangibility of human-embodied knowledge and the other is the non-appropriable character of human capital outside of a slave society. At the more practical level, the accounting profession also points out that difficulties in measuring the value of and establishing transferable title to human capital make it difficult to introduce accounting standards that would allow human capital to be treated as an asset for the purposes of financial reporting. Finally, those preoccupied by the operational implications of human capital information such as government policy makers, company human resource managers and educators, often note that human capital measurement and accounting are useful only insofar as the information generated actually becomes part of the incentives and disincentives that motivate decision making in the labour and capital markets.

The aim of this chapter is to review these obstacles in order to ascertain if the valuation of human capital as an asset is feasible. It has been argued that parallel accounting treatment of human and physical capital is fundamentally untenable because human-embodied knowledge is: *i)* non-physical, *ii)* non-appropriable, *iii)* unmeasurable, and *iv)* inherently incompatible with the conventions and institutions that guide the day-to-day transactions recorded by financial accounting and reporting. These objections to the quantification and accounting of human capital reflect, in part, the three-part definition of an asset.

An asset must be an economic resource, the resource must be controlled by the entity, and its cost at the time of acquisition must be objectively measurable (Anthony and Reece, 1983, p. 36).

These criteria suggest that ***four conditions*** must be met by human capital in order for it to be amenable to treatment as an asset for financial accounting purposes.

- **Condition 1:** Corresponding to the notion of "economic resource", human capital must be measurable as defined by the output potential of specific competences.
- **Condition 2:** Although "control is an accounting concept that is similar to but not quite the same as the legal concept of ownership" (Anthony and Reece, 1983, p. 37) it is essential to establish that the fruits of investment in human capital can be appropriated by the investor as they accrue.
- **Condition 3:** The cost of buying, or in the case of human capital the "rental" price, must be objectively determinable.
- **Condition 4:** The final supplementary condition, perhaps self-evident when it comes to physical capital, is that in day-to-day transactions, capital and labour markets recognise estimates of the value of the output potential of human capital investments.

Section 5.1 considers the first two conditions by analysing the theoretical reasons why it is or is not possible to measure and "control" the asset value of the productive capacity of specific human competences. Section 5.2 examines the third and fourth conditions by analysing the problems associated with establishing accounting and market recognition of human capital.

5.1. OBSTACLES TO THE MEASUREMENT AND OWNERSHIP OF HUMAN CAPITAL

Capital, understood as an anticipated capacity to produce, can only be evaluated on the basis of a more or less risky forecast of future output. Assuming, for the moment, that market validation will occur,[21] the distinction between human capital and other inputs, turns on two dimensions: the degree of predictability of the output potential (Condition 1) and the certainty of appropriability of the output potential (Condition 2). In fact, logically, once it is possible to assign to a particular human competence both a specific output potential and the associated costs and benefits of such potential, then the subsequent valuation problems (as with physical capital) are tied up with the contingency of negotiation and market outcomes (contracts and sales).

i) **Human competences: intangibility and measurement**

The problems of measuring human capital arise, in large part, from conditions of market failure that are sustained by legal and institutional frameworks that insist on the dichotomy between tangible and intangible capital. As Machlup points out:

> "Perhaps the term "tangible" is misleading. The fact that a machine can be seen and touched with our hands does not make the machine a capital good. What we see and touch is a surface of steel, copper, plastic, or other material, but not capital. It is capital thanks only to its assumed capacity to produce future returns, and this capacity is not tangible; it is not even observable, since we can observe, at best, the machine's operation in producing something, but these products may not be valuable, or not sufficiently valuable to secure a positive net revenue including a net return to the investment. Thus, although the capacity to perform valuable operations may be embodied in physical objects (machines) as well as in human beings (workers), the capacity is itself never tangible. The costs of creating, improving, or maintaining such capacity are investments either in capital goods or in human capital" (Machlup, 1984, p. 428).

But the determining factor, as Machlup points out, is not the physical materiality of productive capacity, but the ability to assess both the output capacity and subsequent market returns with reasonable accuracy. In this respect, the "asset value" of human and physical capital are similar in two ways. The first, both require an estimate of output potential. The second, both require calculating rates of return, based on estimates of the probability that the output will actually meet both effective demand and the cost and price standards set by competition.

One question to consider then, is whether human and physical capital are, in fact, so different in meeting these two requirements as to justify the very large differences in their treatment under financial accounting and reporting practices. After all, the output potential and rate of return of physical capacity are variable, subject to the risks of loss, damage, or obsolescence, not to mention uncertain rates of depreciation. At any time, with differing degrees of probability, equipment can fail to meet performance expectations or become outdated by new technology or shifts in demand to new products.[22] Nevertheless, an estimated opportunity cost is attached to the equipment such as its scrap value, or its resale value, or its rental value. Similarly, as Machlup points out, rental prices for human capital are established by wages. True, as proxies of asset value, the rental prices for human capital in the labour market are subject to considerable uncertainty and imperfection. As Machlup puts it: "both kinds of data – asset prices and rental prices – are available for physical capital. For human capital, however, only rentals are determined in the market, and even these cannot be established with any degree of accuracy" (Machlup, 1984, p. 424).

But it is not the accuracy of wages as measures of rental prices that is called into question. Where the ambiguity arises is in the link between the productive capacity of human capital assets and the transaction-established prices. Thus, the similarities between human and physical capital as assets appears to end when it comes to the task of actually measuring output capacity as a basis for calculating or referencing transaction values. The machine has a specific engineering-based output rating of *x* widgets per minute while *ex ante* the output potential of human competence remains vague and unspecified. Again Machlup captures the argument succinctly:

> "[Investment in human beings does] constitute formation of capital with all traditional characteristics: the capital is durable and yet of limited service life; it calls for maintenance and replacement as does any other exhaustible or "wasting" resource; it may become obsolete before being depleted; and, as far as subjective value is concerned, it can appreciate as well as depreciate depending on the supply of complementary factors and the demand for their joint products. Though its value may be appraised by the individual in whom it is embodied, it may also be appraised by others, including the policy-making members of society. Such appraisal, however, is arbitrary and subjective and rarely recorded in any written or printed statements of the type corporations issue regarding the stock of their real or financial capital" (Machlup, 1984, p. 424).

Machlup's assessment suggests that the key issue is appraisal, not the intrinsic nature of human capital as intangible. However, like many theorists of human capital, Machlup takes a pessimistic view of the prospects of appraisal because of the complications posed by questions of ownership and market-generated valuation.[23] Once it is recognised that human capital is physically embodied (*i.e.* tangibly present in the form of a person or team) like a machine or building, the problem then becomes how to create an inter-temporal market when the asset cannot be sold as a separable commodity. By plunging directly into such difficulties as achievement certificates, wage-setting and contracts establishing ownership, most economic theory side-steps the challenge of measuring the output potential of human capital prior to market valuation. Without explicit theoretical and practical recognition of the output potential of human capital, the task of introducing market mechanisms for what appears to be a phantom asset seems almost impossible.

Prior recognition of the output potential of specific human competences is a fundamental starting point for establishing a market for these assets. A transactions-based process for arriving at the value of human capital depends upon the explicit acknowledgement that a person embodies a reasonably predictable capacity to produce specific output. Taking this step faces two principal hurdles.

- First, there is the practical difficulty of actually assessing the output potential of specific human competences in a reliable, generally accepted and inexpensive fashion.
- Second, a variety of problems are posed by the predominant methods for assessing human capital that are geared to the needs of an education system that extracts fees by controlling credentials as opposed to a system where the output potential of human capital is measured on the basis of competence to produce regardless of how such knowledge was acquired.

Looking at the first problem, there is a growing body of evidence suggesting that it is possible to objectively evaluate the output potential of acquired competence (Burke, 1989). Section 6.1 offers a number of examples of recent initiatives in "independent" competence-based assessment geared more to the needs of production than those of the educational establishment. These policies reflect efforts to address structural changes in labour markets and education systems. A more prevalent form of competence assessment occurs within firms as part of the conventions and rules that shape the internal labour market of the firm. In certain countries, industries and firms, there are well-established methods for recognising and upgrading competences, and entire sectors share the same approach to measuring and improving the output potential of people (OECD, 1989, p. 104; Green *et al.*, 1992). The advantages offered by such systems of competence assessment are emerging from studies that examine the differences in performance of firms and the capacity to introduce new forms of work organisation (Boyer, 1992; CEDEFOP, 1993; Lundvall, 1992; Tapscott and Caston, 1992).

Concerns have been expressed about the reliability of efforts to assess competences in ways that accurately reflect the conditions encountered in production. These concerns are well founded, particularly given the relatively underdeveloped character of many evaluation systems. However, as debates over capital treatment in the financial accounting literature amply demonstrate, the reliability of valuation estimates for assets are as good as the methodology of assessment and the predictability of future events. In this respect, forecasts of the output potential of human capital do not differ intrinsically from the uncertain performance of other types of investment.

The second impediment to measuring the output potential of specific human competences involves the institutional configuration of the supply of learning and the extent to which the measurement conventions of the supply side dominate those of the demand or production side. The difficulties of measuring the output potential of human capital are compounded by the convention of assessing human-embodied knowledge on the basis of its inputs, *i.e.*, educational certification. This is similar to measuring the output capacity of a widget machine based on the weight of its steel components, useful for calculating floor bearing loads but not much use in estimating "rated" performance. From this perspective, one of the obstacles to measuring the output potential of human capital is the segmented and oligopolistic character of educational and professional certification. These processes exert a powerful influence over both learning and the certification of learning. Very often certification depends, at least in part, on having spent a specific amount of time in a formal education setting or passing particular tests. These barriers to entry are rooted in the historical power of universities, guilds and professions to forbid the utilisation of acquired competences without certification and are largely explained, from an economist's perspective, as ways of extracting rents from investors in human capital. The traditional state-sanctioned assertion of property rights over the knowledge acquired when people invest in human capital is one way of resolving the paradox of knowledge as a public good and as inalienable from the person in whom it is embodied.[24]

At a practical level, Section 6.1 (Chapter 6) points towards a number of OECD country experiences with policies that are beginning to transform the generally dominant role of educational institutions in the explicit assessment or certification of acquired human capital assets. These policy initiatives are propelled, in large part, by both the competitive success of firms with superior methods for human capital utilisation/investment and the ongoing distress in labour markets. At the moment, the extent of independent competence assessment of human-embodied knowledge varies significantly across OECD countries. Most nations, responding to the changing technology and organisation of both learning and production, are only now beginning to search for new methods of validating the output potential of specific human competences. Such potentially "universal" systems may supplant or supplement the existing means for meeting the "economic resource" requirement (Condition 1) that "human capital must be measurable as defined by the output potential of specific competences."

ii) Human competences: ownership and control

Implicit or explicit, legally enforceable or socially negotiated, contractual relationships are a fundamental characteristic of transaction-based societies. The contract to rent the human ability to produce marketable products represents one of the most basic economic relationships in all OECD countries. Exploring the range of uncertainties and different degrees of knowledge and access to resources that characterise labour markets serves as the background to the question of how to establish title to human capital. On the surface the title to human capital is entrenched in the basic right of "free" labour.[25] However, title without the right to engage in contractual relationships fails the economic test of ownership as the capacity to trade.

> "The logic of contract law should be applied to human capital investments; even though workers can quit when employers abuse their authority, such quitting unfairly shift costs to workers if wages are implicitly or explicitly deferred (to pay for training). Far-sighted employers have little incentive to damage their labour reputations by behaving opportunistically. This offers cold comfort, however, to employees in marginal or overextended firms seeking survival at any cost. Only if both sides are required to perform as if under contract will the new customs entailed in human capital investment protect workers from abuse" (Jacoby, 1991).

Thus, the challenge is to apply contract law to investments in human capital. The doctrine of "contract at will", with the reciprocal rights – at any time and for any reason – of employers to hire/fire and employees to quit, does not preclude entering into inter-temporal agreements that involve sanctions for breach of contract. Employers and employee organisations (unions) enter into this type of contract on a regular basis. Many governments have also introduced laws that enforce reciprocal obligations, including for example the requirement that firms finance employee training. One of the criticisms of mandatory training expenditure of this kind is precisely that the reciprocal obligation of the employee to acquire additional human capital is not equally enforced or enforceable. One method for overcoming this problem is to provide market type incentives to labour by attaching value to the acquisition of human capital. Both employers and employees must be able to internalise the costs and benefits of investment (inter-temporal returns) in order for the incentives in a transaction based economy to function. Only artificially abstract definitions of "free" labour and a "free" market restrict the labour contract to the immediate present renewed at every instant by the "goodwill" of employer and employee or terminated on a moment's notice by the "illwill" of either employer or employee.[26] The labour market remains "free" so long as reciprocal rights and obligations (contracts) are entered into willingly and the capacity to withdraw is guaranteed. The extent (or cost) of the freedom to withdraw from the contract will then depend on the collective decisions of the society as reflected in the laws and institutions that establish and regulate labour contracts.

Meeting the requirement that an investor be able to reap the benefits of their investment in order for that investment to qualify as an asset (Condition 2) appears simple when it comes to the individual. For the individual there is no ambiguity with respect to ownership of their own capacity to produce and any improvements to that capacity arising from investments in knowledge acquisition. However, the clarity of title should not obscure the ambiguity of many current methods for assessing the output potential of a person's human capital, including the relationship between acquired knowledge and compensation in the labour market. As a consequence, the incentives and disincentives associated with ownership of unrecognised or uncompensated human capital can be very unclear. For example in some countries, an individual's investments in knowledge acquisition, whether financed by personal savings or financial loans, can be deducted from their taxable income both in the current period and the future. Under these circumstances an individual not only controls the asset, but is granted recognition – albeit usually for a certificate designed to meet the needs of educational institutions, not production. Here, title is given meaning by state-sanctioned financial accounting and reporting. Regardless of the form of recognition, what is at stake for the individual is the degree of transparency and certainty attached to the human capital information and decision-making systems that shape choices.

As for firms and governments, neither can own the asset created by an investment in human capital. They can and do regularly control the benefits of such investment by signing contracts with individuals who acquire knowledge using money borrowed from firms or governments. Firms lend to employees in a variety of ways through explicit and implicit agreements and using direct and indirect financing (*e.g.*, apprenticeship, payroll deduction, sponsored educational leave, deferred wages, etc.). Governments also enter into a range of "contracts", social and private, in order to finance individual investment in human capital assets (*e.g.*, training subsidies, active labour market policies, educational loans, etc.). In terms of formal accounting and reporting, however, such contracts are either unrecorded or not generally accepted by accounting conventions as equivalent to control over an asset and are therefore treated as current expenses.

In concluding this section, two points are worth bearing in mind. First, the output potential of human capital is capable of being measured (Condition 1). Second, although human capital is always owned by the individual or team that possess the competence, it is possible to define contracts in which the benefits due to acquiring such competence is in the hands of the lender (Condition 2). Thus, there needs to be a recognition that two of the obstacles impeding parallel treatment of human and physical capital are not intrinsically insurmountable, but instead are analytically and institutionally determined by the existing systems of competence evaluation and contractual obligation. The next section deals specifically with these accounting and market recognition issues for individuals, firms and governments.

5.2. OBSTACLES TO ESTABLISHING ACCOUNTING AND MARKET RECOGNITION OF HUMAN CAPITAL

Establishing human capital as an asset requires not only theoretical plausibility, but also recognition of this capital in daily accounting records and in the wage settlements that actually divide the costs and benefits over time among the various legally entitled claimants. This section considers these two operational obstacles to establishing human capital as an asset. At first glance, Condition 3's requirement that the cost of renting human capital be objectively determinable seems to be easily resolved since wage rates are clear price signals that can be objectively determined and recorded in individual, company and government accounts. Complications arise when the goal is to record not just any price but the asset value of human capital, that is, its inter-temporal costs and benefits, as it relates to each of the three sets of agents. Condition 4 stipulates that human capital be recognised as an asset in the day-to-day transactions of the labour market. This raises two basic questions. First, in the labour market, will firms pay wages (negotiate contracts) that recognise the achieved and validated competence assets of workers?[27] Second, in capital markets, will banks and other lenders (e.g. governments, firms) recognise human capital stocks and acquisitions in ways that reflect asset values?

Typically, discussions of accounting and reporting of human capital as an asset run into two immediate obstacles. First, most current output- or certificate-based measures of human capital are deemed inaccurate or exclusive to the firm or unknowable and therefore inadequate for assessing productive potential. Then, secondly, without adequate measures of acquired competence, there is little incentive for individuals or firms to collect or develop high quality human capital information. Thus, the absence of efficient and accurate systems for validating the productive capacity or competency of human capital undermines efforts to engage in financial accounting and reporting of such assets. And, without practical recognition of human capital as an asset there is little incentive to establish even inexpensive (universal), high quality systems for the identification and validation of competences.

Recently there has been a growing awareness of the advantages reaped by individuals, firms and governments when an effort is made to overcome these practical obstacles to recognising human capital as an asset. Succinctly, the key to overcoming the operational impediments is to understand how effective and practical accounting (Condition 3: costing) and market recognition (Condition 4 : transaction validation) of human capital are contingent upon the establishment of clear measurement (Condition 1: assessment of the output potential of specific competences) and ownership/control (Condition 2: contractual obligations that recognise inter-temporal costs and benefits). Thus, meeting the terms of Conditions 3 and 4 requires prior introduction of the institutions and conventions that clarify and entrench the measurement and control of human capital. Once this basic infrastructure is in place, the next steps depend on public and private legal and operational practices, specific to each country, that govern what is considered both an acceptable entry in financial records and a feasible outcome of negotiations regarding rental of human capital.

The obstacles considered here do not arise from the intrinsic attributes of human-embodied knowledge. However, as with the impediments discussed in the previous section, the solutions are similarly influenced by legal and institutional history. While the institutional and historical specificity of countries prevents the implementation of uniform policy solutions, it does not invalidate a series of analytical insights regarding the general feasibility of financial accounting and reporting of training and labour force qualifications.[28] Individuals and governments also engage in cost reporting (Condition 3) and transaction validation (Condition 4), in the form of personal income reporting, national income accounts and numerous other types of financial record keeping. Analysis of these three sets of agents underscores the strong connection between cost reporting requirements and validation in everyday market transactions. Record-keeping conventions and operational decisions by individuals, firms and governments play a major part in determining whether or not the 3rd and 4th conditions can be met in ways that establish the inter-temporal asset status of human capital. The next few paragraphs look at each of the three sets of agents in turn, bringing to light the nature of the obstacles to costing and market validation of human capital.

i) Individuals

The previous section argued that the preconditions for financial accounting and reporting of human-embodied knowledge as capital that generates returns over time involved the establishment of systems for measurement and ownership/control. However, both measurement and ownership can only reside in the individual (or in a group of individuals that have invested in the development of a specific capacity). Consequently, accounting for human capital as an asset must flow through contracts, entered into by individuals and employers, that take into consideration the costs and benefits of investment and use of human capital.

For individuals, this means that the financial value of their investments in human capital must be incorporated into the rental price or employment contract. As has already been discussed, there are numerous obstacles to validating the financial worth of human capital in the rental contract. For example, if firms are only allowed to charge human capital investments as a current expense then there is a reduced incentive to incur costs today that will only be recovered tomorrow. Simply charging the rental of human capital as if it was entirely a current expense has the effect, among others, of generating a conflict of interest between the owner of the asset who wants its full value recognised and the firm that is renting that asset and only sees current utility (Stern and Ritzen, 1991). In this sense, the recognition of human capital as an asset for the individual is contingent upon the ability of the firm to treat such contracts in a way that does not harm the balance sheet.[29]

In this context, even if it is assumed that viable measurement and contractual systems are in place, individuals do not have much scope to alter, single-handedly, either the costing or negotiating conventions and institutions that they face. When it comes to personal recording/accounting of the costs and benefits of investment in human capital, the parameters are mostly determined by government definitions of income, taxes and educational fees.[30] When it comes to market validation of human capital investment in the labour market, the parameters are determined by a range of conditions from segmentation and unionisation to unemployment rates and management practices. Thus, meeting Conditions 3 and 4 is, from the perspective of the individual, largely a function of government-sponsored legal prerogatives and/or the prevailing patterns set by industrial relations.

For individuals, better measurement and legally sanctioned/encouraged contractual possibilities are of central importance in overcoming the firm- and government-based obstacles to operational accounting, reporting and market valuation of human capital assets. From the individual's perspective perhaps the most critical steps needed in order to meet Conditions 3 and 4 is to ensure that Conditions 1 and 2 are met in inexpensive, clear and universally accepted ways. Unless individuals are able to measure their acquired human capital they cannot begin to record the inter-temporal costs and benefits. Without accepted negotiating conventions and contract precedents, individuals cannot borrow for the purpose of learning acquisition or include in the rental price the costs associated with learning acquisition. For the individual, obtaining recognition of their competences as assets requires a series of interdependent steps, starting with measurement of output potential and contractual rights and ending with recognition by firms and governments of the recorded costs and future value of acquired competences.

ii) **Firms**

At the level of the firm, the critical prerequisite for meeting Condition 3 is the nature of the systems in place for managing the internal labour market. There is strong support for this point of view in the human resource accounting literature and a general acceptance of the feasibility of "objective costing" of human capital for the firm. As Bullen, Flamholtz and Sackman (1989, p. 235) explain:

> "The increasing recognition of the importance of human assets in current economics has provided impetus for the development of human resource accounting (HRA), which involves accounting for people as organisational resources both for managerial and financial reporting purposes. Although the more recent trend has been toward viewing HRA primarily as a management tool, human resource cost measures may provide information to both management and external users regarding costs incurred by organisations in such areas as selecting, developing, and maintaining human resources. Human resource value measures can quantify the economic value of people to the organisation."

The general lack of systematic sanctioned accounting conventions indicates that costing human capital in company accounts and reports, though feasible in theory, does not translate easily into practice, because the necessary accounting conventions have not been generally introduced (Flamholtz and Lacey, 1981).

Section 6.2 (in Chapter 6) examines recent developments that promise to help overcome the regulatory and implementation impediments to human capital costing in company accounts.

Firms face a similar practical type of problem when it comes to recognising or validating the "estimated value of the output potential" of human capital (Condition 4) in the rental transaction. In theory, the wage offered for the rental of an individual's competence should include, among other factors, recognition of the cost of investing in the acquisition of the relevant skills. However, in practice, the firm generally pays the "going wage" which reflects a range of labour market conditions. In any case, the individual or negotiator on behalf of the employees is not likely to know what share of their overall human capital (which includes health and other physical capacities) is attributable to knowledge acquisition. Hence, even if the employee and employer were willing to incorporate estimates of amortization, depreciation and appreciation costs/benefits into the rental agreement they would find it most difficult to do so.

In a way that echoes recent developments in the theory of the firm, this analysis highlights the critical role of methods and institutions for measurement and contractual obligation (Aoki, Gustafsson and Williamson, 1990; Brunetta and Dell'Aringa, 1990; OECD, 1993a; Osterman, 1984). Firms with well-developed systems for assessing competence and productivity are well positioned to introduce some form of human capital accounting and reporting. Often these same firms have well-established, implicit or explicit, contractual relationships with their employees that include compensation for acquired human capital. Other firms either do not have the capabilities or the financial means to pursue assessments that are often expensive and imprecise. Nor do these firms have the negotiating experience or resources that would allow them to enter into contracts that explicitly validate the estimated value to the firm of a person's acquired skills. In the absence of nationwide efforts to establish appropriate and affordable human capital information and decision-making systems, firms that are unable or unwilling to develop such systems on their own are likely to suffer from lower productivity growth and reduced ability to compete because they will be less effective and efficient in acquiring and using human-embodied knowledge.

Variations in the practical implementation of human capital costing and contract validation reflect differences in regulatory frameworks across countries and jurisdictions, in the managerial and technological character of specific sectors and in the size of firms (Mathews, 1993; OECD, 1993*b*). The costs associated with assessment and negotiating methods and institutions also vary in ways that can encourage or discourage more or less explicit inclusion of human capital valuation. For example, individual firms may be hesitant to invest in upgrading employees' skills if they fear that these people will leave the company before they can recuperate the cost of training. The government can oblige non-training employers (free riders), to pay for the benefit of "poaching" trained workers through a tax. Here, public or para-public institutions can play a decisive role in reducing both the overhead costs and free-rider disincentives that act as a impediments to meeting Conditions 3 and 4 at the level of the firm.

iii) Government

Clearly, governments can do a great deal to overcome the obstacles to accounting and market recognition of human capital investments by individuals and firms (see Chapters 6 and 7). However, the focus here is less on government as a framer of the decision-making context than as a decision-making agent engaged in the deployment and financing of human capital and the keeper of the national accounts.

Governments face three main obstacles to human capital costing and transaction validation. In its role as employer government, like firms, are subject to the same strengths and weaknesses of national approaches to measurement, contract negotiation and internal human resource management. A second obstacle, more exclusive to the public sector, is that many governments use cash not accrual accounting methods.[31] This practice limits the capacity of governments, within the context of operating budgets, to engage in "inter-temporal record keeping", (allowing them to accumulate liabilities and assets over time) even if financial measures of human capital costs and benefits were available (see Section 6.3).[32] Finally, governments must make human capital investment (subsidy) choices on the basis of inadequate national accounting systems. As Eisner (1989, pp. 5-6) eloquently notes regarding the United States:

> "[The] official accounts (...) not only exclude all acquisitions of tangible or physical capital by government, including government enterprises, and by households, they also exclude the acquisition of intangible capital in all sectors. (...) And what are we to make of the vast amounts of expenditures, market as well as nonmarket, for education, training, and health, let alone for the raising of our children, which create the human capital on which our future depends. These exclusions of so much capital formation from official measures of investment may also vitiate international and inter-temporal comparisons. Can we confidently say that the United States is lagging far behind other nations in investment without counting R&D, education, government capital and expenditures for household durables in ways that are comprehensive as well as comparable across countries? (...) And is American investment declining if capital formation shifts from business spending for plant and equipment to education and research? The answers to these questions are not found in the conventional accounts."

Transforming the national accounts and the methods used by government to record day-to-day operating assets and liabilities is no small affair. The impediments to improving the costing and transaction validation practices of government are generally significant but nonetheless amenable to reform. In fact, many OECD countries are involved in initiatives aimed at improving both the internal and national accounting practices of government (see Section 6.3 in Chapter 6).

However, as recent efforts to introduce intangibles into national accounts have revealed, aggregation depends critically on what is being measured at a more micro level (Carter, 1994). From this perspective, the capacity to arrive at more policy relevant and analytically accurate data depends on the accounting schemes used by individuals and firms. Improved financial accounting and reporting of human capital becomes an important stepping stone.

In conclusion to the analysis in this chapter, there are four main points. First, the so-called intrinsic obstacles to treating human capital as assets can, in theory, be overcome. Second, the operational problems of implementing financial accounting and reporting of human capital (or the somewhat narrower category of training and labour force qualifications) are also surmountable, but not without significant effort and innovation. Third, whatever individuals, firms and governments may do in this area, all are influenced, if not constrained by existing requirements of systems for financial accounting and reporting of human capital assets. Lastly, it is apparent from the analysis of the four conditions for treating human capital as an asset that establishing systems a) for evaluating acquired human competence; and *b*) for facilitating contractual relationships that incorporate the cost and benefit streams associated with human capital-are essential preconditions for effective and efficient financial accounting and reporting of human capital. In a transaction-based economy, these elements form the backbone of a strong human capital information and decision-making system.

6

IMPROVING THE MEASUREMENT, ACCOUNTING AND MARKET RECOGNITION OF THE STOCKS AND FLOWS OF ACQUIRED HUMAN COMPETENCES

> "(...) The concept of further education and training (FET) markets holds promise as a guide to policy across broad areas of education, labour market, and industry policy. Smoothly functioning FET markets will contribute to an efficient allocation of resources for skill formation and, in particular, provide the incentives for improving the efficiency of institutional providers, as well as having the knock-on effect of improving the allocation of skilled workers in the labour market. But FET markets would benefit from the kind of structure, standard setting, and general market making roles that public authorities play in labour markets, capital markets, and a variety of other product and factor markets" (OECD, 1991*b*, p. 12).

What is less clear is how to establish "smoothly functioning markets" when the cornerstones of a transaction relationship such as established financial values and explicit contractual prerogatives are missing, incomplete or inadequate to the changing needs of the economy. This chapter reviews a number of seemingly disparate initiatives across countries and firms in order to identify coherent patterns of changes and policies that facilitate the functioning of the knowledge economy. A general trend emerges of the strengthening of the institutional and regulatory preconditions for better financial accounting and reporting of human capital assets. At a practical level, individuals, firms and governments are gradually putting in place the new collective frameworks and recognised standards upon which improved human capital information and decision-making systems depend.

As is typical of the mixed economies that characterise the OECD nations, the pressures for institutional transformation and innovation often outpace the rate at which the political process and collective choice can implement change. Consequently, it is not unusual to find that a number of initially independent and reactive initiatives only begin to coalesce over time into more coherent, effective and systemic change.[33] Considering the challenges posed to traditional institutions and ways of doing business by the transition to a knowledge-based economy, it is also not surprising to find that there are many spontaneous and frequently uncoordinated efforts under way, in fields ranging from education and accounting to the behaviour of labour and capital markets.[34]

One of the most promising areas of innovation involves achievement-based evaluation of human capital accumulation. Individuals, firms and governments are taking steps towards new methods of assessing and accounting for prior learning.[35] The current interest of individuals in competence-based systems of education and training reflects the competitive and technological forces that are altering not only the ways in which we produce but also how the labour market functions. Presently, there is progress at the level of the firm's human resource management and accounting practices, towards more transparent and recorded methods for guiding the acquisition and use of human-embodied knowledge. Lastly, the examples cited in this chapter indicate that OECD governments, in recognition of the new supply and demand conditions for skills, are also beginning to alter the parameters for human capital decision making.[36] Cumulatively, the numerous institutional and regulatory innovations add up to a potentially powerful new approach towards facilitating structural economic change.

This chapter outlines a number of recent efforts to introduce competence-based prior learning assessment. These experiences tend to confirm the analysis in the previous chapter regarding the importance of better evaluation for improving accounting and reporting of human capital in labour and financial markets. At a practical level, it is also evident that progress in one part of the human capital information and decision-making system often depends on developments in another. Country experiences show a strong interdependence between efforts to improve the incentives for individuals and firms to invest in new skills and reforms to facilitate human capital measurement, accounting and market recognition. These connections point to the need for all three sets of economic agents – individuals, firms and governments – to have both the capacity and motivation to use the new signals. As conclusions from an OECD conference on further training noted:

> "Strategies to achieve change in favour of the public interest need to rely less on changing the respective interests of the social partners than on ensuring that the outcomes of the social partners pursuing their interests are more favourable from the public point of view. This depends heavily on an indirect approach of policies influencing the 'rules of the game' – how costs against earnings are defined, for instance, or what is at stake with employment security" (OECD, 1991*b*, p. 9).

Each of the next three sections illustrates progress in the implementation of policies that reform human capital information and decision-making systems, in ways that fulfil some of the goals and overcome some of the obstacles outlined in Chapter 5. These sections review how initiatives in the areas of accounting, education and labour market policy are combining to introduce new human capital information and decision-making systems.

- *Individuals.* For individuals there are a number of examples of prior learning assessment and competence validation systems being introduced. In some countries, valuation issues are also being addressed.
- *Firms.* For firms there is a gradual move towards financial accounting and reporting of intangible assets, including new methods for reporting human capital.
- *Governments.* For governments there has been some effort to introduce new methods of accounting for public expenditures on human capital along with modest reforms to the structure and functioning of education and training systems.

6.1. AT THE INDIVIDUAL LEVEL – DIVERSE NATIONAL INITIATIVES TO DEFINE AND MEASURE ACQUIRED COMPETENCES

One of the most notable developments in the last decade is the general trend across OECD countries to offer individuals alternative means for recognising and validating their acquired skills and knowledge. Although many of these initiatives were initially motivated by the goals of greater access to education and employment relevance, one of the results has been a gradual transformation of the way in which individuals receive and transmit information about their skills. There is considerable variation in the extent to which these new signals are accepted by firms in making decisions regarding wage levels or banks making decisions about lending. In many circumstances, explicitly negotiated and transparent links between competence validation and market valuation have not yet been made. However, it is worth noting that at a number of levels, there is a new and growing potential to turn measurement into valuation as new active labour market policies are combined with reform of educational financing and closer ties between learning institutions and the workplace (OECD, 1989 and 1993*b*).

The national examples touched upon below indicate the broad range of experiences, from Australia where there is a more explicit link to labour market outcomes, to Canada where the focus is almost entirely on the concerns of educational institutions during a period of extended fiscal restraint. There is a growing body of literature examining the efforts under way in OECD countries to establish systems for validating competences. In particular, an OECD seminar on "Assessment, Certification and Recognition of Occupational Skills and Competences" (October 1992) provides an in-depth review and analysis of such national initiatives at the level of initial vocational education and training (see OECD, 1996 in the bibliography). Much of the focus is on post-compulsory learning since demographic, technological, and competitive forces have been steadily increasing the importance of recurrent learning for almost two decades now. This growing emphasis on post-compulsory learning also brings a greater dependence on the quality of human capital information and decision-making systems. This does not mean that choice is being ignored at the level of compulsory education. In fact, the efforts to introduce decision-making options in the realm of compulsory education simply reinforces the role of common competence standards and seamless articulation between different stages and types of knowledge acquisition.

The following four examples illustrate the link between changes in the educational sphere and the general trend towards new types of validation for individual acquisition of knowledge. The examples used here concentrate on reforms to post-compulsory learning and the extent to which these changes provide human capital with the kind of transparency and valuation required for more efficient decision making, lower-risk transactions and improved inter-temporal financial accounting and reporting.

i) Australia introduces national competence standards

The Australian initiative to reform its system of vocational education and training is one of the most comprehensive and ambitious efforts to improve human capital information and decision-making systems. Driven by a desire to boost productivity throughout the economy, the Commonwealth government is implementing a detailed and all-encompassing National Training Reform Agenda. Competence standards, co-determined by business, labour, educators and government are the cornerstone for the entire system (see Annex B). Recognition of prior learning, regardless of the source, and using broadly accessible assessment mechanisms based on competence standards, is also an explicit part of the framework (VEETAC, 1991, p. 3). In July 1992 the national and state governments in Australia signed a formal "Agreement for a National Framework for the Recognition of Training" with specific sections on the principles and processes related to both recognition of prior learning and assessment mechanisms.

The chief executive of the National Training Board, Mr. Alan Godfrey, summarizes the impact of these reforms on individuals as follows:

> "There are a number of benefits for the individual because performance criteria – what an employee is judged on – are known. It is easier for individuals to make their own assessment of themselves and to see what is required for the next level of advancement. They can more readily see career paths – where the skills they have are going to be relevant for another industry and their skills will be recognised across the country" (Cant, 1992, p. 52).

This optimism has not been universally shared. A number of groups on both the supply and demand sides of the human capital market have voiced serious concerns. On the supply side, educators across the spectrum, but particularly in post-secondary institutions, have attacked the competence-based approach as both unworkable from a definitional perspective and an invitation to standardization at the lowest common denominator (Penington, 1994). On the demand side, employers are hesitant about both the costs and the workplace relevance of competence-based standards (Henderson, 1993).

These debates, like the implementation process, are far from over. The Australian reforms are still in the initial stages with the final design and operational results a number of years away. However, attainment of the stated goals would have clear benefits for an individual trying to assess the risks associated with investing in additional human capital. This is strongly reinforced by the stated goal of integrating the new system of validating acquired knowledge with the outcomes of "award restructuring and enterprise bargaining" (Australian Employment and Skills Formation Council, 1992, p. 3). Firms are also likely to gain a better insight into the competences of current and future employees.

ii) Canada introduces official "prior learning assessment and standard setting"

Canada's highly decentralized federalism divides responsibility for labour market and training policy between different levels of government. The federal government has traditionally assumed primary responsibility for the insurance-based unemployment system and a national tripartite board meant to assist with the implementation of more active labour market policies. At the more practical level of implementation and direct authority, provincial governments are largely responsible for educational institutions, standards, and schemes for sectoral training. This division of power complicates the already difficult task of introducing more transparent qualifications based on achievement and the recognition of such standards in the labour and capital markets.

At the provincial level, there are a number of examples of progress towards improving human capital information and decision making. Two examples, one from Quebec and one from Ontario, illustrate reforms aimed at facilitating the measurement, if not valuation, of acquired human competences. Quebec began to implement a comprehensive system of secondary and post-secondary prior learning assessment in 1984. Ontario initiated a process for developing competence standards and assessment mechanisms for community colleges in 1990. In both provinces, the focus has been on recognition of credits equivalent to those of academic institutions. The links to the labour and capital markets remain, however, significantly underdeveloped. In the case of Quebec:

> "(...) The government took three decisive steps [in 1984]. First, it published a policy statement on adult education which made an important priority of implementing Prior Learning Assessment in secondary schools, colleges and

> universities. Then it added a section to the Regulations respecting the basis of college organisation which stated that, starting on July 1, 1984, students could obtain credits for their non-academic learning. Finally, it agreed to subsidise a provincial structure of technical and financial support for colleges in order to implement and develop Prior Learning Assessment" (Isabelle and Landry, 1987, p. 167).

Subsequent developments have underscored the implications of validating acquired competence for individuals and educational institutions. In the case of immigrants, for example, a report presented at the OECD Porto Seminar points out how the new system facilitated access and recognition for individuals' existing stock of human capital within the existing academic framework. This process has challenged educational institutions to reassess standards and methods of assessment and instruction. Reforms are moving in the direction of competence -based validation as part of an effort to respond more directly to the needs of individuals and the labour market (OECD, 1996).

In Ontario, policies to facilitate recognition of acquired human capital are part of a larger reform of the vocational education system (colleges). Separate from the efforts to reform the education system, the provincial government has been pursuing changes to the system of firm-based training by establishing a new tripartite institution: the Ontario Training and Adjustment Board. The extent to which these initiatives will interrelate remains to be determined. Nevertheless, the contours of a system for prior learning assessment are slowly coming into focus, with an emphasis on the practical aspects of its implementation such as financing, organisation, standards, and testing methods. In the near future it is expected that individuals will be able to validate their skills and knowledge (acquired) through work experience, community activities, volunteer work, non-college and independent study.

> "Prior learning assessment (PLA) is based on the premise that many adults acquire skills and knowledge through work experience, community activities, volunteer work, non-college and independent study. A PLA system evaluates this learning and relates it to courses and programs at formal educational institutions. Using PLA, adult candidates who can demonstrate or document that they have achieved the objectives of a given course may be given formal college credit. (...) Recognising college-level learning achieved by adults outside the (...) college system accomplishes at least three objectives. First, it enriches our colleges by making them more accessible to a broad range of adult learners. Second, it encourages adult learners to pursue further education and training programs which will enhance career opportunities and help candidates become more productive and capable members of society. Third, PLA can increase efficiency of the colleges by eliminating the need for costly and unnecessary retraining" (Ontario Council of Regents, 1992, p. 1).

iii) France introduces "Assessment Centres"

For the individual, facing the intricate and formalized structure of the comprehensive training system established in France in the early 1970s, the introduction in 1987 of a new institution targeted at individual assessment marked a potentially important shift towards more flexible and portable recognition of acquired human capital.[37] The significance of this move towards individual assessment goes beyond the formal establishment of Centres, that were initially intended to address the needs of the long-term unemployed. What appears noteworthy, from the perspective of the individual looking for validation of acquired human capital, is that:

> "All of the social partners are agreed on the need to raise the level of qualifications of the labour force and experiments are being carried out to find ways of determining and certifying the personal and occupational skills acquired by those sections of the population with few or no formal qualifications. This marks not only a significant change in the concept of continuing adult vocational education and training by eliminating the need to teach skills already acquired, but also a move away from the persistence of the diploma as the one and only benchmark" (Colardyn, 1990, p. 6).

The driving force behind the validation of competences appears to be the reality of firm-based human resource management. However, the "use of assessments, grading and the credentialing of skills as a means of improving career planning and human resource management" sparks considerable concern on the part of unions and those who set certification standards (Colardyn, 1990, p. 18). At issue are questions of portability of skills, wage rates, and participation in setting the standards and methods used to validate acquired human capital. The debate between the social partners and interest groups involved and the process of implementing the changes is still under way. Still, the French case is promising in that the multi-level and multi-partite participatory structure of the training system and the long-standing links between formal employee qualifications and employment conditions such as pay and job security, imply that the refinement of prior learning assessment could significantly improve the valuation and transparency conditions underlying human capital information and decision making.

iv) The United Kingdom introduces National Vocational Qualifications

> "The importance of the National Council for Vocational Qualifications (NCVQ) is not just that it is policing the qualifications system. It is also changing the nature of vocational qualifications. (...) New methods of assessment are being introduced so that there is a move away from traditional exams and a greater emphasis on judging people by what they do at work. (...) The time is fast approaching when not only will most people be qualified but their qualifications will really mean something in terms of professional standards" (Fennell, 1993, p. 5).

Efforts to reform the terms and conditions of competence assessment and certification in the UK are strongly tied to changing economic conditions. In part, the introduction of National Vocational Qualifications (NVQ) reflects the fragmented and relatively underdeveloped condition of vocational training in the UK (Prais, 1989). However, given the ambition and range of the changes – to cover the entire employed population – the impact is likely to go beyond the traditional institutions and methods for vocational training to cover the entire working population. In light of the emphasis on assessment and certification regardless of the source of knowledge acquisition, these reforms promise to transform human capital information and decision-making systems throughout the economy.

> "In essence, a National Vocational Qualification (NVQ) is conceived as a statement of competence, clearly relevant to work, that is intended to facilitate entry into or progression in employment, Further Education or training. It is to be issued by a recognised body to an individual. The statement of competence should incorporate specific standards – the ability to perform a range of work related activities – and – the skills, knowledge and understanding which underpin performance in employment. (...) This quiet revolution goes far beyond Further Education" (Burke, 1989).

According to the National Council for Vocational Qualifications (1993), NVQs have eight characteristics:

- specification in terms of learning outcomes;
- composed of a number of discrete units;
- credit may be awarded for each unit;
- credit may be accumulated;
- access to assessment is universal;
- alternative forms of evidence of achievement will be accepted;
- certification will be awarded to all who meet the required standards, irrespective of the time taken, or the mode of learning adopted; and
- certification indicates an immediate capacity to perform competently in an occupation.

The implications of this type of standard setting are profound. Case studies of specific firms show that NVQs are entering into use and are deemed important for controlling and motivating investment in human capital (Green *et al.*, 1992).

Naturally there is considerable controversy surrounding the implementation of such sweeping changes. One concern is that the standard setting and assessment methods are inadequate. Prais compares the proposed NCVQ approach with French and German practices and concludes:

> "No one, of course, objects to practical testing; quite the contrary. The objections to the Council's proposals are: *a)* to the reliance on (practical testing on the job) as the one essential element, *b)* to the use of workplace supervisors as assessors rather than independent examiners, and *c)* to the narrowness of the skills required for qualification" (Prais, 1989, p. 227).

Overcoming these limitations, and meeting other challenges such as the introduction of a National Record of Achievement will take time.[38] In the process individuals are likely to gain a greater degree of recognition for their competences. These new conventions for recording acquired knowledge may improve both the valuation of human capital as reflected by wage rates and the allocation of specific competences to particular production tasks. It is expected that improving the signals that guide the acquisition and utilisation of human capital will, *ceteris paribus*, increase productivity and competitiveness throughout the economy.

6.2. AT THE FIRM LEVEL – A PRAGMATIC APPROACH TO ACCOUNTING FOR HUMAN COMPETENCES

Accounting, as accountants make clear, combines careful attention to details and conventions with a pinch of innovation and artistry. Innovation, starting with double-entry bookkeeping a few centuries ago, is an important part of a discipline meant to provide useful information about the financial status and prospects of an enterprise in a changing world. Modern accounting not only attempts to capture the dynamic information needed by the managers running the firm, but also addresses the requirements of shareholders, borrowers, governments and even employees for timely and relevant data regarding firm performance. With these goals and audiences in mind, it is not surprising that accountants have attempted to respond to recent changes in the technological, organisational and competitive circumstances facing firms. As Gleeson pointed out twenty years ago:

> "The lack of information about human resources in financial reports is well known and requires no documentation. Because of that omission, management and investors are likely to make suboptimal decisions. Human resource accounting is an attempt to overcome that shortcoming. It aims systematically to identify, measure, and present information about the human resources of an organisation where this will be of value" (Gleeson, 1975, p. 82).

More recently, responding to changes at the level of the firm, accountants have shown a renewed interest in Human Resource Accounting (HRA).[39] Looking at current practices in the field of accounting for "human resources" leads to the following important, if somewhat paradoxical conclusions:

- Human Resource Accounting (HRA) would improve information for decision making and stewardship.

- External Human Resource Reporting is likely to have a reflective effect on management practices by inducing improved internal information systems and raising the profile of human resource management within organisations.
- At present, expenditure on human resources is generally charged against income of the period and no direct evidence of its impact on human resource values is shown in financial reports.
- International Accounting Standards Committee (IASC) guidelines on asset recognition do not preclude capitalisation of human resource expenditures in balance sheets.
- There are examples of human asset capitalisation in published and audited company financial reports, indicating satisfaction of both feasibility and cost/benefit criteria for versions of this approach in appropriate circumstances.

The paradox, partially explicable, arises from the conclusion that HRA, although quite useful and feasible, is only rarely practised. Efforts to introduce human capital accounting have been under way for some time. Unfortunately, there has been relatively little progress towards its widespread use.

Recently, however, the obstacles to progress cited in the accounting literature (discussed in Chapter 5 above) seem to be diminishing. In particular, there has been a growing recognition of the link between new measurement and valuation systems for "intangible assets" and firm performance. This has important implications for human capital because the definition of intangible ranges from "the intellectual property rights of patents, trademarks, copyright and registered design; through contracts; trade secrets; public knowledge such as scientific works; to the people dependent, or subjective resources of know-how; networks; organisational culture, and the reputation of product and company" (Hall, 1992, p. 135). The broad scope of the definition of intangible assets means, on the one hand, that many of the analytical and policy conclusions do not pertain directly to human capital issues. On the other hand, technology changes, management practices and markets are demanding major innovations in accounting definitions, conventions and systems, opening up new possibilities for human capital accounting (Bradley, 1992; Cortese, 1989; Egginton, 1990).

A good example of this trend is a recent study of intangibles (excluding human resources) which recognised that:

> "The reporting of intangible fixed assets has presented company directors, accountants and investors with a growing problem. The regulators of accounting practice in most important economies have discouraged companies from

> capitalising intangible fixed assets within their financial statements, mainly because:
>
> - there existed no generally accepted framework of methods for valuing intangible assets; and
> - there was perceived to be a high degree of subjectivity involved in valuing intangible assets" (Arthur Andersen and Co., 1992).

After outlining the impediments to valuation of intangibles, the report goes on to suggest ways of addressing these problems by introducing the necessary frameworks, conventions and valuation expertise. Although the study concentrates exclusively on fixed intangible assets such as patents and trademarks rather than "soft" intangible assets like human capital, the report indicates the growing importance and gradual integration of non-physical assets into accounting frameworks and institutionally sanctioned practices.

In practice, firms are beginning to include a range of intangible assets in the financial accounting and reporting systems that inform managerial decisions and relationships with shareholders, banks, governments and employees. Transaction validation for intangible assets is becoming more and more commonplace. As Cortese (1989, p. 42) points out:

> "(...) A growing number of commercial lending institutions are acknowledging that intangible assets may be collateralized in the same manner that 'hard' assets have always been. However, while bankers have long relied upon equipment and real estate appraisers in establishing collateral values, there has been real resistance in some quarters to basing lending decisions on the values that reside in intangible assets. In fact, the valuation of certain intangible assets subsequent to the purchase of a business has become commonplace in order to allocate a portion of the purchase price to identified depreciable intangible asset values for tax purposes."

The extension of accounting to intangible assets on a regular basis is being accompanied by a greater recognition of human resources in terms of competences and asset value. As Colardyn (1990, p. 21) notes in the case of France:

> "The question of the recognition and certification of competences has been brought to the fore by the economic restructuring that business and industry are undergoing. Since 1975 the economic crisis has coupled with far-reaching technological changes and a reduction in the level of employment. These factors have brought about a reversal of employment policy within enterprises. Firms are adopting a new approach to the management of human resources, introducing career planning systems based on the recognition and certification of skills. In light of this, the social partners are anxious to pursue the discussion in order to come to some agreement on one or more negotiated positions on the certification and credentialing of skills."

This type of detailed recognition of competences is indicative of new management and accounting practices. In part the diffusion of firm-based recognition of competences reflects "best practice" examples like those of Japan.[40] Firms, faced by new competitive pressures, are exploring not only technology and product innovations but also the information and decision-making systems capable of improving the acquisition and use of resources for strategic advantage. Although OECD countries, at the firm level, are characterised by a significant diversity of both initial conditions and responses of managerial and institutional systems to new competitive challenges, it seems there is a growing momentum of organisational changes and improved record keeping of the full range of intangible assets. Furthermore, these changes and improvements are mutually reinforcing (OECD, 1991*a*).

The general progress being made in developing rules and practices that extend financial accounting and reporting to intangible assets does not, however, vitiate the need to introduce specific regulatory guidelines, and institutions that would facilitate more widespread human capital accounting. Without established rules and conventions for financial accounting and reporting of human capital internal or external to the firm, both the limited use and high initial cost militate against its introduction. However, measurement problems are a recurring theme in this report and in many of the analyses and case studies of human capital accounting. In general, the mixture of pessimism and optimism reflects the challenges of introducing workable systems for measurement, accounting and market validation when both the specific competences and methods of assessment of human capital are changing.

The simultaneous innovations in intangible asset accounting, human resource management and the reform of systems for competence acquisition and assessment have two important implications. First, the reforms under way within the firm, in human resource management and reporting are crucial building blocks of more comprehensive and accepted systems of financial accounting and reporting of human capital. Second, external to the firm, the changes taking place in the assessment of intangible assets in general and human capital in particular, promise to reduce the overhead costs and increase the incentives associated with financial accounting and reporting of human capital. In general, these new approaches to human capital information and decision making, particularly in firms where design, innovation and ideas are the predominant sources of productivity improvement and competitive advantage, are driving practical changes throughout the economy. Aggregated across the economy as a whole, these changes are likely to significantly improve the efficiency of human capital investment and utilisation.

6.3. AT THE GOVERNMENT LEVEL – CHANGES TO NATIONAL AND BUDGET ACCOUNTING SYSTEMS, AND EDUCATIONAL REFORM

> "Investment, or capital spending, may be defined broadly as the expenditure of current resources to produce income or other benefits over some period in the future. Investment is distinguished from outlays for consumption, which are intended to provide immediate benefits. The federal budget [US] and most other accounting systems treat all government outlays, even purchases of long-lived assets, as consumption because the purchases cannot clearly be shown to produce income as officially measured. Yet some federal expenditures clearly seem to be investments: like private investments, they produce a stream of economic benefits over time. The conventional definition of investment thus might reasonably be extended to include federal spending for physical infrastructure, some human resource programs, and research and development" (Congressional Budget Office, 1991, p. vii).

Governments have a profound and pervasive influence on human capital information and decision-making systems. From the nature and content of initial compulsory education to the definitions of corporate and personal income for tax purposes, governments play both a direct and indirect role in shaping the decisions made about human capital utilisation and acquisition. Short of reviewing the multiplicity of relevant policy initiatives across OECD countries, this section selects a number of reforms that point towards improvements to human capital information and decision-making systems. As discussed earlier, these changes are generally not co-ordinated and are often motivated by factors unrelated or only indirectly associated with the aim of greater transparency and certainty for human capital transactions. A unifying thread can be found, however, in the need of all OECD economies to respond to altered conditions of production and firm-based competition.

The examples of new government policies briefly reviewed here can be grouped into two categories. First, there are changes taking place in government accounting practices, both for budget and national income purposes, in response to the influence of strong fiscal pressures, changing patterns of public demand and innovations in managerial techniques. And, second, there are a broad range of reforms under way in the structure and functioning of education systems, from "back to basics" curricular reforms to systematic redefinitions of learning achievement aimed at facilitating competence assessment as well as active labour market policies. Each of these areas will be considered in turn.

i) Accounting reforms

Two types of accounting reforms have the potential to alter the content and methods of government decision making regarding human capital acquisition and use. First, there are the accounting methods applied to aggregate budget categories by finance ministries which take fiscal responsibility for the government as a whole.[41] The second area where government accounting matters for human capital information and decision making is at the aggregate level of national income accounting. Recent initiatives in both these areas offer examples of progress towards public-sector accounting methods that can record human capital as an asset.

The internal information and decision-making systems used by governments for budgeting are, in general, doubly removed from financially based accounting and reporting of human capital as an asset. The first step away from an intertemporal valuation of human capital investment is taken because of the cash basis of much government accounting. Second, traditional budget categories fail to identify human capital investments as a distinct category. Many critics believe, as pointed out in Chapter 5 (Section 5.3), that this overriding focus "on obligation controls and cash flows distorts decision making, prejudicing investment and understating liabilities" (Budget of the US Government, Part 3, 1993, p. 3). Even within so-called "capital budgets", there is a bias towards current cost/budget balance issues and little systematic effort to include human capital investments. Recent efforts to change these accounting methods are driven, in large part, by the need to cope with fiscal limits and concerns about the effectiveness/efficiency of public-sector expenditures and regulations.

In order to succeed, these performance or results-oriented approaches to government decision making require a reassessment of the ways in which output is measured. One ambitious example in this direction is the effort under way in New Zealand to introduce accrual accounting methods to the public sector.[42] Although the primary aim of the shift to accrual accounting is to establish lines of accountability that permit greater autonomy and initiative for public-sector managers to meet their output or service goals, accrual methods also imply different treatment of assets and liabilities. In essence, government accounting moves away from the cash-based approach towards an attempt to link incurred liabilities and accrued assets over time. Looking at New Zealand's experiences Goldman and Brashares explain:

> "The previous system was completely cash-based. Expenses were recorded only when the cash was actually spent so departmental budgets were exactly equal to projected spending (outlays). Capital purchases were handled in the same manner as personnel expenses with no recognition that they are productive for years. As a result, there was little incentive to use current capital efficiently. [The new accrual] system is designed to match more closely the cost of resources consumed in the production of goods and services with the revenues or services produced (...). The balance sheet of assets and liabilities are useful in assessing the department's financial performance and whether the government's asset base has been maintained. Aggregated, these statements

could be used to assess the net worth of the government and promote shifting from short-term fiscal deficit to a long-term focus" (Goldman and Brashares, 1991, pp. 81-82).

Thus, moving public-sector accounting to an accrual basis does not automatically change the treatment of human capital as an output of government activity nor does it necessarily alter the government's role as employer. What is important is the greater potential of these new accounting techniques to make investments in human capital assets a relevant part of the definition of public-sector output and introduce a much greater degree of inter-temporal recording of assets and liabilities generated by public-sector activity.

In its role as employer, the public sector confronts many of the same obstacles to human capital accounting that the private sector does. From this perspective, the need for effective measurement and contractual validation of human capital as a way of facilitating record keeping applies as much to government as to firms. The gains from a shift in accounting methods and definitions are unique to the public sector in terms of the delegation of authority and the determination of optimal investment levels. As numerous studies and policy papers have indicated, it is very difficult to determine whether government-provided human capital infrastructure is being under- or over-financed (OECD, 1989). It is also difficult, in many countries, to delegate decision making regarding human capital investment given the present "invisibility" of the actual costs and benefits to the individual, local government authorities and businesses. Reforming internal government accounting techniques helps to address these challenges by clarifying both the goals and the costs and benefits that shape decision making and incentive systems (OECD, 1993*b* and *c*).

In order to achieve greater efficiency within government it is important not only to clarify the inputs and outputs of public-sector activity but also reassess the external accounting methods. The most significant form of empirical monitoring is usually contained in national accounting systems. These accounts are one of the primary sources for measuring the outcomes of government investment in human capital. Economists and national income accountants have attempted to address the traditional exclusion, as discussed in Chapter 5 (Section 5.2), of human capital from aggregate measures of economic conditions.[43] Work in this area has benefited from the recent resurgence of interest in infrastructure as a determinant of economic growth. As a result there has been a flurry of analysis and advice regarding aggregate human capital investment as part of infrastructure spending. A good example of the feasibility and utility of this type of study is the US Congressional Budget Office report entitled *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy*. However, as the report makes clear, considerable analytical and empirical effort will be required in order to establish generally accepted criteria for measuring the output of government spending on various forms of human capital investment (including education, training, social services and nutritional assistance). Thus, once again, the difficulty of measuring the stocks and flows of acquired knowledge remains a major stumbling block in the way of efforts to treat human capital as an investment activity.

ii) Educational reforms

Across OECD countries there are numerous examples of changes that are contributing to the dual movement towards greater transaction certainty/transparency and inter-temporal treatment of human capital. The two areas of reform that seem to have particular implications for human capital information and decision making are: *a)* attempts to encourage the delegation and decentralisation of choices regarding human capital investment, often in conjunction with efforts to introduce or reinforce systems for defining competence achievement and fair assessment;[44] and *b)* efforts to establish or improve the links between social and labour market development policies in order to better address the human capital potential of individuals and the needs of firms, *i.e.*, the trend towards a greater preponderance of active labour market policies. What is striking about both of these areas is that more accurate determination and accounting of the productive capacity of acquired human capital is a necessary although not sufficient condition for the success of these policies.

Initiatives to delegate and decentralise human capital decision making by introducing new regulatory frameworks and standards are being applied to every segment of the supply of learning, from elementary schools to on-the-job training. Whether it is Sweden's efforts to promote a "learning society" or Germany's attempts to reform the occupational categories of the "dual system", there is an effort across the board to improve the quality of the information and practical relevance of the incentives facing investors in human capital. An OECD summary of the direction of research on education and the economy points out both the scope and implications of these changes:

> "On the education side, investment has to be seen in the perspective of an individual's total lifespan with at least three distinct but articulated phases: primary and secondary, post-secondary and adult education and training provided both within and outside enterprises. New approaches to the design, content, delivery and management of programmes in all three phases hold promise for economic and social development, including a focus on the quality and relevance of learning processes, inputs and outcomes, the development of space- and time-free opportunities for learning, partnerships at all levels, efforts to improve the efficiency of the providing agencies, targeted programmes for enhancing skills and professional competence, and new national strategies for research and development" (OECD, 1993*d*, p. 2).

The continuing emphasis on lifelong learning, brings to the forefront the need to reform the information and decision-making mechanisms that determine learning acquisition choices. Reforms should take into account, for individuals, their lifetime pattern of investment in human capital, and for institutions, the existence of multiple distinct learning pathways and the need for mobility and linkages between them. Consequently, it is not surprising that many of the recent policy initiatives are broadly institutional and regulatory in nature, involving the reconfiguration of the signals and options facing individuals and firms, from tuition costs and types of diplomas to new bi-partite training boards and multi-institutional learning consortia. There are many examples to illustrate these initiatives, such as changes to the Australian post-secondary tuition system, to French technical high school diplomas, to Canadian labour force training schemes, to European sharing of educational resources.

Increasingly educational reform is occurring either simultaneously or in direct co-ordination with initiatives to implement active labour market policies. Efforts to move away from narrow income support policies towards systems that enhance individual's labour market chances are providing another incentive to improve human capital information and decision making. These initiatives aim to link learning acquisition (labour supply) with needed skills (labour demand). Arguing in this vein, *Labour Market Policies for the 1990s* (OECD, 1990) stresses the link between competence issues and labour market flexibility:

> "For these reasons some minimum level of regulation or provision negotiated between the social partners should ensure flexibility in both internal and external labour markets. In particular this will be indispensable when old job boundaries are removed and broader job classifications are introduced. A public vocational training system, for instance, will mean maintaining a certain number of well-defined job categories for which curricula and diplomas will have to be specified and followed. Similarly, if pay scales become increasingly based on all-round competence, some collectively agreed and defined standards of competence will be needed so that the system is clear to all participants in the labour market and so that wages can act as market signals in the economy at large. This would imply, for instance, that workers have the right to have the details of their range of skills and work history regularly certified by their current employers so that they can make them available to prospective new employers" (OECD, 1990, p. 79).

In this way, enlarging the scope and effectiveness of active labour market policies is also reinforcing the trend to improve the measurement and accounting systems that track training and labour force qualifications. This, in turn, has a positive influence on the human capital information and decision-making systems that are at the crux of the intricate relationships linking learning processes and the needs of the workplace to the choices and uses of acquired competences.

6.4. TOWARDS STRONGER HUMAN CAPITAL MARKETS – FINDING COMMON GROUND FOR ACTION

Summarising the various initiatives discussed in this section, the basic thrust is towards improving the transparency and certainty of transactions involving human capital investment and rental contracts. In other words, the conditions necessary for efficient transactions guided by market or quasi-market relationships are slowly being established in areas that were previously subject to either monopolistic control or failed the basic test of tradability due to insufficient "commodifiation".[45] However, progress is quite difficult to evaluate or generalise across OECD countries because of the significant differences in industrial relations frameworks, education and training systems, and economic structure (CEDEFOP, 1988, p. 41). The analytical framework developed in this study suggests that the criteria for assessing progress towards improved human capital information and decision-making systems must take into account the simultaneously implicit and explicit, collective and individual nature of human capital transactions.[46] This inherent complexity implies, in turn, that any policy prescriptions require careful assessment of the many independent and interdependent institutional systems, from the general contexts set by industrial relations and taxation systems to the specific conditions determined by managerial practices and the technology of production, that guide human capital decision making.

Notwithstanding, there still remains the need to move beyond the methods used in the past to overcome the problems posed by the heterogeneity and "invisibility" of the processes by which human competences are acquired and used. At a practical level, competence assessment systems are beginning to transform the two dominant features of the supply and demand sides of human capital. First by recognising that we no longer live in a period when most human capital investments and competences are set by legal requirements for compulsory and universal public schooling, validating acquired knowledge provides a framework for adult learning. Second, competence assessment systems reflect a shift in the workplace away from the simple connection between the well -defined, stable skills required for production in the manufacturing era and the cognitive/behavioural competences instilled by the compulsory educational system. In the past, the lack of choice on the supply side and the uniformity of requirements on the demand side greatly facilitated individual and managerial decisions regarding the acquisition and use of human capital (Hornbeck and Salamon, 1991). It also made easier the role of government in providing public education.[47]

One of the reasons for the slow pace of change, underscored in Part I, is the intricacy of altering human capital information and decision-making systems that involve such a wide range of decision-making agents from individuals and firms to schools and government ministries. There are also many different institutional and regulatory regimes that establish the information and risk parameters (*i.e.* predictability) facing an individual, enterprise or government decision maker. For instance, as pointed out earlier, an individual facing the choice of where and how to invest in the acquisition of knowledge is confronted with a range of more or less uncertain results, including what they will actually learn by investing in a particular programme of study or work experience and what will be the eventual rental price(s) (evolution of career earnings, lifestyle prospects) offered by an employer(s) for the application of the acquired knowledge to production.

In certain countries like Germany, the risks and costs associated with these choices for all decision makers have tended to be lower as a result of regulatory and institutional arrangements that specify the knowledge to be acquired, the methods used to acquire the knowledge, and the likely compensation during and after the learning period (German Federal Ministry of Education and Science, 1992). The following quote helps to illustrate how elements of the German "dual" system, such as the three-part certification process used for initial training, improve the transparency and reduce the riskiness of human capital decision making.

> "The system of assessment in vocational training in particular by administering a national final examination offers important benefits:
>
> - a standardized level of vocational qualifications in the labour force is maintained and controlled with a high degree of standardization of training results,
> - employers receive valid information for hiring employees,
> - the uniform qualification level is a basis for negotiating wages,
> - trainees are strongly motivated for vocational training because of the advantages for persons with respect to the certificates,
> - and implementation of new training regulations is supported" (OECD, 1996).

The extent of the crisis in existing human capital information and decision-making systems is partially revealed by the fact that even this renowned German "dual" system is seen as inadequate to the needs of a knowledge-based economy where the distinction between manufacturing and services is evaporating (*The Economist*, March 12, 1994, pp. 19-26). The limitations of existing systems and of most efforts at policy reform are also evident in other countries. Part of the problem is due to the relatively greater divide in traditional systems between education institutions and the recurrent learning of new skills for today's rapidly changing workplace. Another complication facing changes in human-capital information and decision-making systems is the difficulty of introducing effective incentives within firms where labour relations are profoundly adversarial. However, as "continuous improvement" and "total quality" become imperatives for all firms, the underlying trend is towards more socially organised and explicit systems for recognising acquired competences. Today's more successful firms usually have highly developed internal labour "markets" that offer clear and fairly certain information regarding both the attributes and value of human capital (Brunetta and Dell'Aringa, 1990; Osterman, 1984). Much of the literature comparing firm performance points out that the capacity to improve productivity and product quality depends, in large part, on the strength of human capital acquisition and utilisation systems.[48] In judging effectiveness it does not matter whether these systems are governed by corporatist institutions of long-standing such as the German "dual" system or the Japanese mixture of life-time employment, systematic job rotation, and rewarding knowledge acquisition (Aoki, 1990; Koike, 1989). The critical issue is that human capital measurement and valuation, both for the individual and the firm, are governed by well established collective and co-ordinated methods of assessment and contractual internalisation of the costs and benefits (Aoki *et al.*, 1990). Regardless of the particular national responses, there seems to be a general recognition that efforts to improve the incentive structures surrounding human capital investment and utilisation are of growing urgency in all OECD Member countries.

Unfortunately, most reforms seem to remain stubbornly compartmentalised as individuals worry about the risk of knowledge acquisition, firms attempt to address the problems of intangible assets, and governments grapple with the complexity of educational quality. In each of these areas, as identified over the previous pages, pragmatic progress is being made. However, largely because of inadequate analytical tools and political resistance, policy makers are finding it difficult to challenge the entrenched systems that have guided human capital decision making, validation and valuation for decades. By default, preference is often given to atomistic, implicit and uncoordinated changes. There are at least two important analytical reasons for promoting more coherent approaches: *a)* the inherently collective or co-operative attributes of the production process within the firm (Chandler, 1992; Coase, 1988; Demsetz, 1992), and *b)* the public good characteristics of knowledge (Romer, 1993; Stern and Ritzen, 1991).[49] A smoothly functioning knowledge economy depends on the compatibility of the signals used to make decisions regarding the acquisition and use of human capital across different categories of decision makers like individuals, firms and governments. Public authorities have a crucial role to play in facilitating constructive developments within enterprises, by ensuring that (external) factor markets work better. Specifically, it is important to both accelerate the process and reduce the cost of establishing greater coherence within and between human capital information and decision-making systems.

Starting with the steps already being taken by individuals, firms and governments, further action to improve the functioning of human capital markets must focus on the development of better signals for competence validation, valuation, accounting and financial reporting. This pragmatic approach builds on the new standards and institutions that are already emerging. In each of these areas, governments can play a crucial role by facilitating the development of prior learning assessment, encouraging accounting innovations, and introducing financial reporting of human capital assets in the public finance and national accounting systems. Public authorities are also in a position to begin breaking down the compartmentalisation that marks the traditional institutional structures of human capital information and decision making. Innovations in the evaluation, accounting, and financial reporting of human capital offer new ways of finding common ground among different decision-making agents and previously isolated institutional systems. This study suggests that one of the first areas where individuals, firms and governments can usefully find common cause is in the development of more accessible, universal and fair systems of prior learning assessment (PLA). For individuals, PLA offers to reduce the risk of investing in human capital. For firms, PLA makes human capital accounting simpler and less expensive. For governments, there is the incentive of more efficient expenditure allocation during times of fiscal pressure and the promise of greater aggregate economic performance. Taking into account the distinct labour market and educational institutions characteristic of each nation, there is nonetheless a common need to pursue universal and democratic methods for evaluating human capital assets.

Chapter 6 has begun the task of analysing the ways in which recent reforms to financial accounting and reporting of training and labour force qualifications are playing a role in making human capital information and decision making more transparent and certain. The examples presented here are indicative of how enhanced outcome or competence-based measurement, accounting and market recognition of learning acquisition can provide a support framework for a series of economic and policy-driven changes to labour market functioning. Further analysis of current policy dilemmas and initiatives will likely help show the way towards more dependable, inexpensive and universal ways of measuring and accounting for human capital.[50] Paradoxically, the limited nature of current assessment and accounting methods means that policy makers have the advantage of being able to design such systems almost from the ground up. The next chapter turns to briefly consider the role of government in and the benefits of initiating policies aimed at improving the multi-dimensional human capital information and decision-making systems.

THE ROLE OF GOVERNMENT AND THE BENEFITS OF RETHINKING HUMAN CAPITAL INFORMATION AND DECISION-MAKING SYSTEMS

Looking back on the post-World War II period, the existing human capital information and decision-making processes may have been fairly well suited to conditions where most of human capital investment was both mandatory (in the form of initial education and training of youth) and geared to inculcating a well-established and economically functional set of cognitive and behavioural skills (punctuality, obedience, basic literacy and numeracy). Thus, compulsory schooling combined with on-the-job learning systems like apprenticeship, not only met the demands of the labour market but also provided a set of signals adequate to the information needs of mass production and labour-intensive service industries.

Today, however, faced with not only technological and organisational change, but also the need to find entirely new knowledge-based areas of economic activity, both the systems that generate information about human capital and those that guide the use of such information are being challenged in most OECD Member countries.[51] Pressures to innovate are provoking widespread changes at all levels of society. This transformation is taking place in the ways in which knowledge is acquired and the uses to which it is being put by individuals, firms and governments. The capacity and rate of innovation – whether in the workplace or in methods for conducting prior learning assessment – are usually governed by past practices and, as Johnson argues with respect to learning and technology, by institutions.

> "A given system of institutions may affect innovations very differently depending on the nature of the particular technologies, and on the stages of development of the technological trajectories in question. In order to be able to stimulate technical change over long stretches of time, institutions have to change. During the Fordist growth period, for example, innovations depended on an institutional system which was very different from the one which would stimulate technical change in the present period. In the present situation, when technological possibilities are still in flux, and technological trajectories

> not firmly established, the openness and diversity of learning processes are of central importance for technical innovation. Some destruction of knowledge from the Fordist technological paradigm is necessary, and searching may have to be intensified in several directions, before routinized learning can again expand along the trajectories of a new paradigm. The flexibility of the institutional system becomes crucial" (Lundvall and Johnson, 1992, p. 42).

It is not surprising that many OECD countries, carried along by the inertia of human capital investment systems crafted to meet the needs of the past, are now facing the type of skill mismatches and occupational confusion that was typical of the labour market upheaval experienced during the transition from an agricultural to a mass production manufacturing economy (Drucker, 1993; Maddison, 1982; Reich, 1992). In today's labour market, individuals, firms and governments are making choices and using resources to invest in the acquisition of human capital based on signals or institutions developed under significantly different economic conditions. In this context, it might be useful for governments to consider the role of improvements to the financial accounting and reporting of training and labour force qualifications as an innovative, supportive or even alternative method of enhancing active labour market policies. There has been a tendency to focus the analysis and policy prescriptions at a fringe of the labour market, on those participants who are directly influenced by welfare, unemployment insurance and minimum wage systems instead of considering new institutions and regulations that might improve the transparency and certainty with which human capital is valued for all members of the labour market.[52]

Narrowly targeted welfare and labour market policies probably miss significant opportunities for improving labour market functioning given the decisive shift towards lifelong learning and knowledge-based occupations in all OECD countries. The days are gone when it was relatively simple, due to the limited set of choices, for individual firms and governments to make decisions about learning acquisition. These changes, in conjunction with the need for greater occupational development and adaptability over a person's working life, call for a new degree of transparency and predictably in human capital information and decision making.[53] In this sense, the success of government efforts to encourage labour market flexibility may depend on policies aimed at ensuring clearer, more reliable, signals for human capital decision making rather than increasing the variance and/or riskiness associated with employment and wages.[54]

A labour market policy that emphasizes improvements to human capital information and decision making, builds on one of the most traditional and familiar roles of government as the neutral collective agent that sets the rules for transactions. At a minimum, property rights, legal tender and contract enforcement rules are all essential for the smooth functioning of marketplace exchanges. One of the elementary propositions of economics is that establishing a universally recognised and reasonably secure legal tender significantly improves the transaction efficiency of market exchange. Denominating all prices in a common currency creates important economies of information gathering and contract negotiation (Coase, 1988). The same logic has been extended in this book to the analytical and practical issues of measuring and recording human capital assets so as to improve decision making and reduce transaction costs. In practical policy terms, how can governments encourage the accounting and reporting conventions that would facilitate the development of human capital information and decision making appropriate to emerging economic circumstances?

As noted in the previous chapter, it is inappropriate to offer blanket policy responses to this question given the diversity of human capital information and decision-making practices across OECD countries. However, governments, in the traditional role as facilitators of both market transactions and mechanisms for overcoming externalities, can introduce or accelerate the implementation of new regulatory and institutional frameworks. One of the primary ways for the State to encourage more effective human capital information and decision-making systems is to establish the collective parameters and guard the general interest when it comes to defining competences, assessment methods and recording conventions (*i.e.*, overcoming the obstacles outlined in Chapter 5). To undertake these tasks, at a national level, requires processes that are simultaneously inclusive, decentralised, and based on a common general framework.[55] In a major report examining the role of social partners in training activities in the European Union, CEDEFOP underscores the importance of "representative" institutions capable of balancing the various competing interests.

> "The traditional social separation of work into intellectual and physical categories will be done away with through the increased application of information technologies among other things. Recognised qualifications can no longer be withheld from workers who formerly carried out practical tasks, as is still the case on occasion even today. While observing the necessary flexibility and job mobility, more importance has to be attached to the definition and necessary demarcation of jobs without reverting to the guilds and fellowships. It can only be successfully guaranteed, however, by including the various interest groups. Such a definition cannot be prescribed by legislature alone; it must be accompanied by compromise among the various groups, which do indeed have highly conflicting interests. It is only when this compromise exists that laws, ordinances and decisions of public channels can be put into practice in line with their original intentions. Without local control and without the assistance of those involved and their representative organisations, *i.e.* in particular without the co-operation of the workforce, it would hardly be possible to develop an adequate policy in the area of vocational and continuing training, which would be able to satisfy the demands of a highly developed society" (CEDEFOP, 1988, p. 93).

Measuring and recording competence acquisition, in order to improve human capital information and decision making, requires the development of low cost, universally accepted, and labour market relevant systems for defining and assessing knowledge acquired for use in the workplace. These systems, shaped according to the specific features of domestic labour market institutions and negotiating practices, should accommodate entry-level as well as adult learners. They need to balance the competing interests of employers, employees, educators, professional associations, citizens (including women, the unemployed, and the disabled, etc.). They must also take into account the needs of different regions. With effective and broad-based participation, the mechanisms for validating human capital acquisition can promote labour mobility and help to remove rigidities stemming from market power entrenched by tradition or outdated regulations and institutions.

For instance, one of the benefits of a national and universal system for assessing and recording competences is its potential to reduce the current fragmentation of certification authority and diversify the provision of knowledge by rendering knowledge acquisition method neutral, *i.e.*, formal, informal, institutional, experiential, all forms of learning have equal chances of being validated. Such an assessment and accounting system would also have the general impact of reducing transaction costs both for individuals seeking to invest in human capital or enter into a contract to rent their skills and for the firm's internal and external labour market decision making. In order to reap the benefits of these policies, governments must work closely with citizen's groups and firms to ensure that new measurement and accounting practices, tax measures, labour market initiatives, and financial regulations – intended to reveal and recognise the stocks and flows of human capital – actually create the incentives, and flexibility that are consistent with both competitive decentralisation of power and general social welfare (CEDEFOP, 1988; OECD, 1989, 1990 and 1993*b*). As explained in Chapter 6, many OECD countries have some elements of this type of transparent, risk-reducing human capital information and decision-making system or are looking at ways to introduce appropriate policies.

By undertaking the role of transaction facilitator, setting up the playing field, the state can help to generate a wide range of benefits, including the following:

- *Strengthening market valuation of training and competences.* Systems for measuring and recording acquired competences encourage individual incremental investment by validating existing assets and providing greater assurance of later market valuation. In addition, a system for measuring competences can be designed to favour modular and continuing learning and therefore help to reduce the lumpiness of investment imposed by the current certification systems. Reducing the cost/duration of incremental human capital investments relative to an individuals existing asset base (partially by validating previously unacknowledged assets using prior learning assessment) is an important step towards both more efficient allocation of an individuals resources and finally shaping investment incentives in a way that reflects rates of return to "recurrent education" both inside and outside the firm.

- *Capitalisation allowing firms to collateralize and amortize knowledge.* One of the primary benefits of establishing the institutional and regulatory conditions for financial accounting and reporting of human capital as an asset is that it opens up a range of new options for firm-based financing. In particular, there is the obvious advantage arising from a more accurate valuation of the firms' capacity to compete and make profit. This allows lenders, owners and managers to explicitly include the stock of human capital in their respective calculations.[56]
- *Clear ownership allowing direct financing of knowledge acquisition.* By giving individuals (or groups) clear title to well-defined competences through universal institutions for assessment and broadly accepted mechanisms for financial accounting and reporting of human capital, learners (investors) can lower the risk and directly link the asset (competence) to its financing.[57] The risks associated with human capital formation are reduced by providing clearer definitions of the competences acquired through human capital investment activity and an improvement in the financial records that are essential for the inter-temporal calculations upon which financing depends.
- *Transparency of labour contract.* Measurement, accounting and market recognition of human capital serve to improve the transparency of the labour contract by revealing employee assets and employer benefits. This aspect of human competence accounting has a wide range of implications for the labour market including the valuation of training as a form of compensation. Critically important is the potential to internalise the value of human capital investment in the rental (wage) contract. The greater transparency of the labour contract arising from the establishment of the asset status of human capital means that firms can, in effect, enter into what is currently called a capital lease.[58] This type of contract benefits both employers and employees. The employer does not (and in this case cannot) buy the asset, but is able to record the value of the lease as an asset with appropriate depreciation, etc. For the employee the advantage comes from being able to explicitly include the cost (or financing charges) of acquiring their human capital or improving it.[59]
- *Validation of alternative learning acquisition.* Institutions for assessing and validating acquired competence are likely to improve the viability of alternative learning acquisition trajectories. By providing a more secure, universally recognised system for validating acquired competences such systems offer greater allowances for the heterogeneity of individual learning capacities,

needs, and experiences and also help to overcome the often artificial or contentless distinctions between formal and informal learning in the workplace. However, in order to safeguard the social benefits that arise from the open sharing of knowledge and pedagogy, the public-sector would have to continue to play a major role on the supply side of learning.

- *Identification of investment patterns.* Financial accounting and reporting of human capital investment would help individuals, firms and governments calculate national accounts and identify investment patterns. This would help with the calculation of under- and over-investment in ways that allow better planning of the incremental investments aimed at realising a particular structure of the stock of human capital.
- *Discourage "unfair" rents, reduce information "noise" and discrimination.* More transparent human capital information and decision-making systems, including methods for validating acquired competence irrespective of the learning process would discourage or eliminate the "unfair" rents extracted by certification bodies, employers or employees on the basis of control over certification or information regarding actual competences. Better information regarding the productive attributes of acquired competences would also serve to reduce many forms of bad information "noise" from fraud to certification inflation. In addition clearer and more judicially neutral forms of evaluation of competence would help to reduce prejudicial forms of discrimination exercised through the rejection of valid competences.

The two terms used extensively in this book – investment and knowledge – represent two sides of the same coin. On one side is the knowledge needed to make investment decisions such as expected costs, productivity, demand and comparative rates of return. On the other side is the productive capacity or competences that make up the stocks and flows of human capital investment. The link between the information used to choose specific investments (investment knowledge) and the actual investments (knowledge investment) is formed by the particular institutions and traditions that define human capital information and decision-making systems. For many reasons, some arising from competition in product markets others due to technological and organisational innovation, the signals and methods used to make human capital investment choices are in the midst of significant change in most OECD countries. As Romer points out, there is an important role for innovation, across the entire range of economic institutions.

> "As the world becomes more and more closely integrated, the feature that will increasingly differentiate one geographic area (city or country) from another will be the quality of public institutions. The most successful areas will be the ones with the most competent and effective mechanisms for supporting collective interests, especially the production of new ideas. The challenge for economic analysis is therefore somewhat delicate. We must take seriously the

> economic opportunities presented by the potential for producing new ideas and for diffusing existing ideas to the widest possible extent. In so doing, we must recognise that ideas are economic goods which are unlike conventional private goods and that markets are inherently less successful at producing and transmitting ideas than they are with private goods. We must be willing to learn from cases where collective action has been socially productive" (Romer, 1993, p. 89).

In keeping with the search for innovation, this book has attempted to explain how and why rethinking the systems that determine human capital investment knowledge will improve knowledge investment. With the hope that – given the ascendance of the learning economy – collective efforts to ensure more efficient and effective acquisition and utilisation of human capital will lead to improved overall economic performance.

NOTES

1. Many researchers have analyzed the changing status of knowledge as a factor of production and concluded that it is qualitatively and/or quantitatively more significant now than in the past, see for instance: Bradley, 1992; Drucker, 1993; Porter, 1992; Reich, 1992. There are also a number of different ways in which the knowledge-intensive or "post-Fordist" economy requires a reconsideration of the decision-making processes. At a minimum discussions of flexible manufacturing (see Adler, 1993) or the role of the financial sector (see Porter, 1992) point towards a greater emphasis on knowledge acquisition and use in order to realize higher levels of productivity and growth. However, it is worth noting that long-run historical series are unavailable because as Machlup points out, neither economists nor statisticians have compiled data on knowledge as an input or output of the economy.
2. *New Technologies in the 1990s* pointed directly at the need to rethink human capital information and decision-making systems: "New Rules of the Game. A climate of confidence for successful introduction of new technologies requires what may be described as 'the comprehensive innovation process' – innovation in a broad range of activities and processes. The spectrum includes not only the enterprise and the market, but also the rules of the game as set by society through its various organs. Hence, entrepreneurship, management, work organisation, financing, the opening up of markets, worker and employer organisations, labour market, educational and regional authorities, etc., are involved. We believe that the more radical the nature of the technological change, the more profound and complex the social interaction it generates, and the more innovative institutional changes it necessitates. (...) It is sometimes forgotten that markets are themselves social institutions operating within a specific legal framework, requiring standards and norms as well as tacit and implicit behavioural rules to give confidence to new investment." (OECD, 1988, p. 13).
3. Human capital has become a topical issue in the media and columnist Flora Lewis has pointed out that "we do not yet understand how knowledge works as a resource (...). Most urgently, we need a theory that redefines labour and how to set its value" (*International Herald Tribune*, May 18, 1993, p. 4). Unfortunately, as Machlup explained in the early 1980s in his last multi-volume effort *Knowledge: Its Creation, Distribution and Economic Significance*: "The production of knowledge is an economic activity, an industry (...). Economists have analyzed agriculture, mining, iron and steel production, the paper industry, transportation, retailing, the production of all sorts of goods and services, but they have neglected to analyze the production of knowledge" (Machlup, 1980, p. 9).

4. As Robert B. Reich (1992, p. 105) put it: "Members of the accounting profession, not otherwise known for their public displays of emotion, have fretted openly about how to inform potential investors of the true worth of enterprises whose value rests in the brains of employees. They have used the term 'goodwill' to signify the ambiguous zone on corporate balance sheets between the company's tangible assets and the value of its talented people. But as intellectual capital continues to overtake physical capital as the key asset of the corporation, shareholders find themselves on shakier and shakier ground."

5. As a particularly blatant example of information failure, the *New York Times* (May 8, 1993, p. 46) reports on the problems prospective employers are having getting references of potential new employees due to lawsuits brought by employees who felt they did not get an accurate reference from their previous employer. "Ten years ago, references were a matter of course. You'd get a feel for the person based on what others had seen him doing in the past", said Penny Shaw, executive vice president of Lee Hecht Harrison, a Chicago outplacement firm. "That's over now. It's become difficult to gather information about a person you are bringing into your world."

6. The debate about over or under-investment in human capital covers the full range of methods for acquiring competences from elementary school and on-the-job training to parental supervision and workplace sharing of knowledge. The bibliography includes works from all sides of this debate; see, for instance, Stern and Ritzen (1991), for a discussion of the reasons for under-investment in on-the-job training and see Shackleton (1992), for a contrary view. Brinkman and Leslie (1988), discuss reasons for both public and private under-investment in higher education. However, if the decisions being taken by individuals, firms and governments are taken into account, it is clear that the current period is one of increasing demand for education and training.

7. It is interesting that general input/output measurement in terms of physical capital items was at the top of the agenda at a special conference entitled "Cost Accounting for the '90s: The Challenge of Technological Change". From among the many references to measurement, here is one that underscores the nature of the challenge even for material factors of production: "Maybe we need to get back to a mechanism that can generate wealth. (...) How do we really do it? We've lost many [economic] battles here [in the United States], and I don't believe we've lost them for the reasons that have generally been proposed. I believe that the biggest opportunity to win the (economic) war tomorrow lies in how you people [cost accountants] think about measurements, and what kind of measurements you provide to your organizations not just with automation and all those things we are now proposing as solutions (...). But the issue is not what the measures of making money are: it's knowing what actions to take in the manufacturing business. How do I know whether I should run products through the plant in lots of 50, 500 or 5 000? How do I know what the impact will be on the bottom line? Or, should I buy this robot? It's very efficient; but it costs a lot of money, too.(...) I really believe that the answer to the challenge of robotics, and group technology, and all these other kinds of things lies in how we measure things" (Fox, in National Association of Accountants, 1986, pp. 14, 16, 23).

8. Machlup is one of the pre-eminent theorists of knowledge as an economic category. It would be beyond the scope of the present work to review the many important insights provided by his multi-volume work, *Knowledge: Its Creation, Distribution, and Economic Significance*. However, this report narrows the analysis of knowledge to that which is embodied in humans and used in production. As Machlup makes clear, there are more "sites of knowledge stocks". He identifies three, of which only the second one concerns the analysis in this report. "For the analysis of various problems connected with knowledge production – for example, the problem of depreciation of knowledge stocks – it will be advantageous to distinguish three sites of knowledge stocks and, corresponding to them, three categories of capital: *a)* knowledge embodied in individual physical tools or machines specially built according to specifications developed in costly research and development, *b)* knowledge embodied in individual persons, specially schooled and trained 'knowledge carriers' and qualified workers with acquired skills, *c)* non-embodied knowledge, created and disseminated at a cost but not inseparably embodied in any particular knowledge carriers or any particular products" (Machlup, 1984, pp. 430-431).

9. A sampling of recent works from across the field can be found in the bibliography, including: Bishop; Brown; Card and Kruger; Couch; Hutchens; Jorgenson and Fraumeni; Kaestner and Solnick; Kiker and Mendes de Oliveira; Lafleur; Lang; Low and Ormiston; McMahon; Nollen and Gaertner; Prais.

10. In a recent paper entitled "Relative Returns to Human and Physical Capital in the US and Efficient Investment Strategies", McMahon sidesteps the causality issues and gives the educational system the black box treatment, writing "This paper does not address the question as to whether the US school system is as bad as some people claim. (...) High rates of return should be evidence that additional investment made where net returns are high is not all wasteful and inefficient" (McMahon, 1991). As Blaug pointed out "the moment we argue that the chief contribution of education to economic growth is to complement the socialization function of families in instilling values and attitudes requisite to adequate job functioning in an industrial society, we necessarily jettison the concepts of any precise quantitative relationship between the growth of the economy and the growth of the educational system" (Blaug, 1985, p. 20). Even at the firm level there has been little progress as Kaestner and Solnick point out: "(...) there have been few direct tests of either the 'human capital' model or alternative theories of employee wage growth within the firm. The reason for the absences of direct tests is that the necessary data to implement such tests are virtually non-existent" (Kaestner and Solnick, 1992, p. 347). Basically the rate of return analyses still assumes that there is some specific educational content that is directly reflected in earnings differentials, in essence dual black boxes, one for education and the other for the labour market.

11. Considerable effort has been expended by economists, particularly with the introduction of game-theory approaches to the labour contract, to provide a theory of labour effort and wages. However, as engineers, managers, and students of "production economics" know all too well, a "(...) problem arises from our inability to fully specify, or at least quantify, all sources of output growth. While the contribution of capital and labour and their composite elements may be considered, other factors are present including economies of scale, organization of the production process, morale, flexibility of work practices, the social factors which lead to "norms" in terms of effort and performance and the institutional systems which govern labour relations" (Grubbström, Hinterhuber and Lundquist, 1987, p. 405).

12. Even more difficult, but nevertheless important, is the productive capacity of a team. From the perspective of human capital information and decision making, the first step likely involves efforts to ascertain the competence of the individuals that make up a team, but as the discussion in the following sections suggests there is no inherent reason why the knowledge capital of a group could not also be subject to careful assessment and, ultimately, financial valuation.

13. This does not mean that the uncertain nature of what is being tested or the conflict of interest between those who set the test, those who are tested, and those who use the test results for hiring decisions cannot be overcome. However, it is important to recognize that many of the existing testing systems suffer from a range of problems, from institutional bias to poor specification of content (CEDEFOP, 1988).

14. The impact of these mechanisms varies according to the type of decision-making systems in which they are used, they way in which decisions are made, the type of information available, and relationship of the decisions to those taken in connection with collective bargaining and strategic planning (see Chapter 6).

15. Knowledge acquired by groups of individuals that becomes collective knowledge or a capacity that is more than the sum of its parts should also be included as a logical extension of a definition based on the productive capacity of human capital. As Bullen, Flamholtz and Sackman (1989, p. 240) point out: "Like all resources, people are seen to possess value to a firm because they are capable of rendering future services... Thus, the value of human resources, are defined as the present (discounted) worth of their expected future services. (...) This concept of human resource value has been applied to individuals and groups."

16. Looked at in terms of a formula, the decision regarding use or acquisition of physical capital (D) is a function of estimates of the output capacity of the physical capital (O), the expected revenue or enjoyment derived from the output (R), the cost of acquiring or producing the output (C), and some discount rate (I) that allows calculation of the net present value of the investment. Thus $D = f(O, R, C, I)$. Each of these variables are subject to differing degrees of uncertainty (for much more detail see a finance textbook like: Brealey and Myers, 1984). Given the purposes of this exposition the terms are simplified somewhat in the text. Lumping together utilization and acquisition into the same basic functional equation reflects the abstract possibility of selling an asset rather than using it. Hence the basic similarity, in this brief discussion of physical capital, of a decision regarding utilization and acquisition. In addition, the distinction between output (O) and revenue or enjoyment (R) is used in this context to draw attention to the differential ability to estimate the quantitative productive or utility enhancing capacity of physical and human capital investment given generally prevalent human capital information and decision-making systems.

17. The extensive literature associated with human resource reporting or accounting provides in-depth discussion of a wide range of issues (see for instance Maunders, 1984, or Flamholtz, 1989. See also Section 6.2 in Chapter 6). The economics debates have mostly taken place in the context of human capital theory (see Section 2.1 in Chapter 2). In the field of education there is an extensive body of literature on assessment, certification, testing, etc. (see for instance Burke, 1989; Mandell and Michelson, 1990; see also Section 7.1 in Chapter 7).

18. As pointed out previously the scope of the terms used in this report are meant to encompass human capital as it contributes to economic, particularly production activities. The notion that financial accounting and reporting is the quintessential test of human capital use and acquisition may appear reductionist and unrelated to actual as opposed to sale sanctioned productivity. The definition of financial accounting and reporting adopted here spans a wide range of information, from firm based cost, management and financial accounting to the government rules that define taxable and national income. For interesting discussions of the pervasive influence of accounting conventions see Block, 1990, pp. 31-33.

19. Informal learning such as learning by doing or learning in the home, may be very significant in adding to the stock of a person's productive knowledge. The fact that this report is concerned only with the use of knowledge in the formal economy or the production site based on monetary transactions does not prohibit the inclusion of informal sources of knowledge.

20. A similar diagram, but much larger given the number of categories, would be needed to address choices concerning the stock of human capital, and would put a detailed list of different competences along the axis where sources of learning acquisition are listed in Diagram 4. The practicality of generating a list of costs and benefits for individuals, firms and governments of different competences is addressed in Chapter 6. As further illustrations of human capital investment issues, Diagrams A.1 and A.2 in the annex offer summary-form presentations of the availability of human capital information and the types of decision-making methodologies used to make human capital investments.

21. Market validation occurs under two conditions. The output must be both in demand and sold at a price that realizes, at a minimum, the rate of return expected by the investors at the outset.

22. The accounting textbook explains: "Evidence of the existence of intangible assets may be vague, and the relationship between an expenditure and the emergence of an asset may be difficult to establish objectively. The economic value of both tangible and intangible assets is dependent on their ability to generate future revenue and earnings, and this often is as difficult to measure for tangible assets as it is for intangibles. However, mere physical existence (obsolete machinery, for example) is no guarantee of economic value, nor does the absence of physical existence (a soft-drink formula, for example) preclude economic value" (Larsen *et al.*, 1984, p. 504).

23. For instance: "Business accounts, quite properly from the viewpoint of individual enterprises, restrict the concept and measurement of investment and the associated capital to the tangible, nonhuman assets that become the property of the firm. With the virtual disappearance of slavery from human societies, human beings as 'labour' are free agents, so that investments in human capital do not become the property of enterprises and therefore enter their accounts only as a current expense" (Kendrick, 1976, p. 440). Machlup echoes this point: "What matters, however, is not the invisibility or intangibility of the improvement [in human capital] but its embodiment in, and inseparability from, the human body, brain, and soul (whatever that may be). The inseparability from the human mind and body makes human capital sellable only in a slave economy. This is probably the most important difference between physical and human capital. It has a highly significant corollary: since real capital goods can be sold in the market, and sales prices recorded, there may exist data reflecting the approximate valuations of the assets by buyers and sellers. The absence of market prices for human capital is one of the greatest obstacles to empirical tests of this segment of economic theory" (Machlup, 1984, p. 423).

24. From a practical perspective it is critical to take into account the conflict between methods for funding learning when knowledge is a public good, and providing accurate, relevant, inexpensive and universally accepted certification of competence regardless of the means of knowledge acquisition. At the heart of this dilemma is the reality that human capital must be embodied in humans while the rents that accrue from the utilization of that knowledge in production must be shared in order to finance learning institutions. Any move to measure acquired human competence that sidesteps existing institutions threatens to undermine the social benefits that accrue from the free flow of knowledge in a market where the power to certify obliges a sharing of rents. Solutions to this challenge depend greatly on the nature of a country's education system and labour market. Each OECD country has different methods for realizing the social benefits of the free flow of knowledge while providing incentives for institutions and individuals to invest in the production and acquisition of knowledge.

25. "The property which every man has in his own labour, as it is the original foundation of all other property, so it is the most sacred and inviolable. The patrimony of the poor man lies in the strength and dexterity of his hands; and to hinder him from employing this strength and dexterity in what manner he thinks proper without injury to his neighbor, is a plain violation of this most sacred property. It is a manifest encroachment upon the just liberty both of the workman, and of those who might be disposed to employ him. As it hinders the one from working at what he thinks proper, so it hinders the others from employing whom they think proper. To judge whether he is fit to be employed, may surely be trusted to the discretion of the employers whose interest it so much concerns. The affected anxiety of the law-giver lest they should employ an improper person, is evidently as impertinent as it is oppressive" (Smith, 1937, p. 122).

26. An intriguing and somewhat dated dissenting view can be found in a book by Commons (1923). He writes: "The labour contract is not a contract, it is a continuing renewal of a contract at every successive moment, implied simply from the fact that the labourer keeps at work and the employer accepts his product... Hence it is that when it is said that 'labour' is property, what is intended is that the labourer owns an expectancy dependent upon the goodwill of his employer. He does not own the job – his employer is under no duty to keep him – he owns the liberty to be continuously bargaining with his employer to be kept on the job by virtue of continuously delivering a service which the employer continuously accepts, thereby impliedly renewing continuously the contract (...). The labourer is thus continuously on the labour market – even while he is working at this job he is both producing and bargaining, the two are inseparable. His bargaining is an act of producing something for the employer and his producing something acceptable is his method of bargaining" (Commons, 1959, p. 286).

27. Obviously competence is only one factor among many that determine wage rates. Furthermore, "recognition of competency" is a relative concept, since the minimum degree of competence might involve showing up on time and the maximum could entail single handedly saving the firm from bankruptcy. A more fruitful line of inquiry, consistent with the focus of this report, attempts to confine the analysis to issues pertaining to human capital information and decision making. From this vantage point the question is: in the context of the decision to hire or deploy labour in production to what extent do validated or recorded measures of competence play a role in determining the rate at which a firm will rent human capital?

28. This is one of the reasons why cross-jurisdictional harmonization of competence assessment or accounting rules across countries is not immediately practical or even desirable in the immediate future as a way to improve human capital information and decision making (OECD, 1993*b*, p. 82). For the most part each OECD country has distinctive, functioning and well-entrenched methods for individuals, firms and governments to record (or in many cases, not record) human capital asset status and transactions. Although the last few decades have been characterized by a growing integration and harmonization of product markets, the national context for financial and labour market behaviour remains strongly marked by specific historical distributions of power and associated legal frameworks. Thus, the means and degree to which competence is measured and then translated through various methods of contract negotiation into recorded market valuation varies not only across countries, but also between sectors, occupations and firms. In some countries, validation takes place within the firm, in others, with different socio-political traditions and labour-management relations, the link between skills and compensations may not be explicit or transparent, so that these competences are not easily amenable to financial accounting and reporting. There is also a wide variation among OECD countries in the extent of integration or coherence among the different types and levels of financial accounting and reporting by individuals, firms and governments. The institutions and methods of learning acquisition and recognition are also highly differentiated across countries. Consequently, effective solutions to the challenge of costing and market validation of human capital as an asset will differ significantly from one country to the next.

29. Note that given the training "free-rider" problem it is likely that an effective solution would require either a system for ensuring that all firms can depreciate the investment part of the wages paid to workers or that all employees are granted some socially negotiated compensation for their investment activity. OECD countries tend to mix these methods to greater and lesser degrees. Some countries depend more on the firms taking into account investments in human capital whether or not this is sanctioned in some general way through accounting or taxation. Other countries utilize subsidies as a way to offer a form of social compensation/incentive to invest in human capital.

30. Many OECD countries are examining methods such as income contingent repayment through the tax system that would begin to take into account the inter-temporal nature of the costs and benefits of human capital investment. For instance a recent report by UK Committee of Vice-Chancellors and Principals has proposed "four methods of raising money from students, which would all delay payment until the students have graduated and are earning salaries" (Authers, 1993).

31. The reader might find it useful to, once again, explain the difference. Accrual accounting "simply represents the common method of double entry accounting which attempts to match revenues and expenditures to the periods to which they relate. It is best contrasted with cash accounting where cash inflows and outflows of a revenue and expense nature are recorded in the period in which they are received or paid instead of the period in which they are earned or incurred (...). The Westminster system of government has effectively forced the public sector to report on a cash basis to reflect the budgeting process on a cash (or 'funds') basis" (Churchill, 1992, p. 39).

32. Usually the discussions of cash versus accrual accounting and operating versus capital budgeting concern, respectively, more efficient results oriented management and how to ensure optimal levels of public investment in infrastructure (OECD, 1993c). Without delving into the many different rules and conventions that shape public-sector accounting and budgeting across OECD countries, it is nevertheless important to recognize that the particular accounting practices of the public sector will play a role in determining its ability to respond to new ways of recording human capital assets.

33. In a review of vocational education in the European Union, the interactive character of the motivation for innovation in the realm of human capital formation was noted. "(...) All the parties concerned seem to agree that the roots of the many new initiatives can be traced back to the fact that fundamental change seems to be taking place in the attitude to vocational training as a whole in one country. The authors stress that vocational training is no longer a buffer against unemployment or an instrument to balance supply and demand of jobs but an investment which will increasingly influence the productivity of companies and sectors as a whole. Their development and survival will depend more and more on the qualifications of their employees. This change in attitude was sparked off by the growing competition to which firms are exposed in all sectors of the economy (...). Consequently, this pressure of competition has led to a change in awareness at the national level, earlier in some Member States and later in others. Those Member States and sectors in industry which were quick to recognize public responsibility for efficiently run vocational training systems, seem to be better equipped to deal with forthcoming structural change" (CEDEFOP, 1988, p. 45).

34. For instance, describing continuing education in the European context, CEDEFOP reports: "On-the-job continuing training of employees is still mainly regarded as the territory of employers. They regard it as a purely company affair. For that reason, a transparent qualification structure, modular systems and transferable vocational training certificates are often still lacking in the continuing training sector. Continuing training efforts of firms are, therefore, usually only of importance when companies switch to new production methods or products. They concentrate solely on schemes to adapt workers' skills to the new work organization and/or new work places. More extensive retraining programs and recognized continuing training programs are usually offered by the state or publicly sponsored continuing training centers set up for this purpose outside the companies. The division of continuing training provision into two more or less entirely separate entities is being challenged more and more from all sides. Labour market problems have led to increased readiness not just in the metalworking sector to place continuing training on a more formalized basis, be this by means of collective agreements or agreements between state authorities and the sectors or regions. There is also a desire to improve this provision in terms of quality and, more particularly, to provide more schemes in order to promote the equal distribution of opportunities between poorly and highly qualified workers, between those in and out of work and between depressed and thriving sectors and regions" (CEDEFOP, 1988, p. 49).

35. It is interesting to note that some of the pioneering work in the area of competence assessment involves the transition of American military personnel to civilian occupations. See Whitener (1992).

36. For a comprehensive discussion of developments in the field of further education and training (FET), see particularly the chapter entitled: "Restructuring FET for a High Skills Economy" in OECD (1993*b*).

37. In the early 1970s France introduced a complex and comprehensive training system aimed at both initial training of young people and retraining of adults. This system involved a multitude of tripartite and bipartite committees at the national, regional, sectoral, and firm levels. As d'Irbarne and Lemaître point out: "The French system of vocational training (...) is extremely complex, with its various geographical levels of intervention – national, regional, departmental and local – its various levels of association – inter-sectoral, sectoral and firm – and the various parties intervening in the training process – the Ministry of Education, the AFPA (Association pour la Formation Professionnelle des Adults) the ASFO (Association pour la Formation et le Perfectionnement des Personnels) the associations and private training organisations – to say nothing of the intermediate organisations such as the FAFs" (d'Irbarne and Lemaître, 1987, p. 82). Compounding the challenges to individuals seeking information for human capital decision making is the dominance of a formal credentialism where long delays in amending or introducing new credentials combine with strong territorial competition between educational, professional, employer and employee associations to undermine the validation of newly emerging skills.

38. The National Record of Achievement is a new system, only in the development stages, that would eventually transform the assessment/certification system away from tests and academic selection towards validation of acquired qualifications or competences (Young, 1993).

39. See, for example, Armstrong (1989); Benjamin (1986); Brennan (1992); Dahl (1988); Dawson (1988); Edmonds (1986) and Gerber (1992).

40. "A practical measure employed in production workshops in large firms in contemporary Japan is to utilize job maps. Usually there are two job maps: one indicates the span of experience and the other shows depth of job experience. A job map of the span (...) lists the positions each worker has held and the level of skill with which he conducts them; whether he handles the job by himself or can instruct his fellow workers. A different job map, of depth, pictures each of the major unusual operations concerning problems in the workshop, and whether a worker is capable of handling them. Similarly to the former map, this depicts the level of skill with which the worker conducts unusual operations. Through updating these two job maps, say every three months, we can identify the level and improvement of skill of individual workers in the workshop. These updated maps are the only practical way of surveying skill accurately in the situation of flexible job deployment. These measures and apparatus guarantee, fair judgment. These assessments [are] (...) connected to the level of compensation" (Koike, 1989, p. 192).

41. It is beyond the scope of the present text to explore the accounting and decision-making methods used, further down the implementation chain, by specific ministries and/or local education authorities to record transactions. However, it is worth noting that on a project by project basis and at the local level there is agreater liklihood of finding detailed cost-benefit studies and carefully defined capital budgets.

42. For more information on the utility of public-sector accrual accounting see OECD (1993c). The bibliography to this report also contains numerous articles examining recent reforms in Australia and New Zealand.

43. See for instance Eisner (1989); Kendrick (1976); Lipsey and Tice (1989), among others who have proposed ways to amend national income accounting to take into account human capital formation and accumulation.

44. The OECD publication *High Quality Education and Training for All* (OECD, 1992*b*, p. 56), notes: "The common trend to the decentralisation of educational decision making has often been accompanied by countervailing policy safeguards, whether they be in the form of national curriculum guidelines or assessment programmes or other centralising accountability mechanisms."

45. For a discussion of the social and public preconditions for market activity see: Bowles and Gintis (1990).

46. For transactions conditions to be normal it means that there are well-established rules regulating valuation (pricing), exchange contracts for the purposes of borrowing or payment, and mechanisms for risk management in the context of an unpredictable world.

47. One of the most important discussions in *Education and the Economy in a Changing Society* (OECD, 1989), concerns the problems facing "training markets". First of all in the context of a comprehensive framework for analyzing human capital information and decision-making systems it is important to recognize that post-compulsory training markets are only one of many arenas for human capital transactions. Secondly, as the OECD points out, "It is questionable to what extent this diversity of training providers can constitute by itself an effective training market so long as unequal conditions of financing, certification, access requirements and legal status tend to establish not an open system of supply and demand, but rather a series of parallel systems isolated from one another, serving different clients and operating under different conditions" (p. 48). For further discussion of the challenges involved in developing efficient transaction systems in the realm of further education and training, see Chapters 5 and 6 in OECD (1993*b*).

48. There is an extensive body of literature that focuses on the determinants of firm performance; see for instance: Best (1990); Brunetta and Dell'Aringa (1990); Boyer (1992); Chandler (1992); Cox and Kriegbaum (1989); Koike (1989); OECD (1989); Prais (1989); Tapscott and Caston (1992).

49. Questioning of the conventional perfect competition model of the firm is now widespread. As Harold Demsetz (1992, p. 9) put it, the theory of the firm has not found a place within orthodox price theory and consensus has not yet been reached on how to do so. Nor, as Romer points out, has the theory of knowledge as a unique type of public good crystallized into an accepted analytical place in economic theory as a whole.

50. Income as defined by tax systems can contribute significantly to investment in human capital. Taxes have a general impact on the rate of return on human capital investment by altering take-home pay. Taxes can also have a more targeted influence by allowing deductions for specific expenditures such as post-secondary education costs or the money accumulated in employee trust accounts for educational leave. The challenge for governments when introducing tax-based deductions, levies, exemptions or even penalties is how to accurately influence patterns and rates of knowledge acquisition. Which programmes of study qualify for individual income tax exemptions? What types of on- or off-the-job training satisfy the firm based "obligation to spend" tax systems?

51. There are a variety of indicators of the failure of human capital investment systems. For instance Bishop (1992, p. 1) notes that "American employers and workers under-invest in employer training. Under-investment occurs because training generates externalities, because turnover is excessive, because the tax system discourages training investment, and because workers lack access to loans that would allow them to finance heavy investments in training". Also see Stern and Ritzen (1991), for a comparative discussion of market failure in the realm of adult training. Furthermore, as the trend towards active labour market policies suggests, current high rates of unemployment and underemployment are indicative of a breakdown in traditional human capital investment systems. In addition, macro-economic factors appear to be disrupting the micro-economic relationships between human capital and employment, productivity, and earnings in ways that may reduce the proportion of the labour market characterized by a virtuous relationship between investments in knowledge acquisition and returns. For some OECD countries the degradation of the functioning of human capital investment allocation mechanisms over the last decade has been manifested in the ever smaller proportion of the labour force generating productivity gains and higher earnings.

52. The preoccupation of public policy with reforming welfare, minimum wages or unemployment insurance in order to foster active labour market policies may be misplaced. The share of resources, relative number of people affected and extent of results are minor compared to the potential impact on the majority of the workforce of better human capital information and decision-making systems. Certainly government spending, efforts to address the validation of acquired competences and associated accounting frameworks, would – in many countries – target a larger share of GNP. The current quantitative estimates of annual expenditures on human capital investment are available in the form of national educational spending (usually without the opportunity costs nor the experiential accumulation of knowledge included) and training expenditure. The OECD average for public expenditure on education in 1988 was 4.8% of GDP (OECD, 1992c, p. 41). The 1991 *Employment Outlook* (OECD, 1991c) examined "Enterprise-Related Training". However, it was not possible to arrive at estimates of firm based training expenditures for the OECD as a whole. Country specific estimates indicate that the range is from 1% of aggregate payrolls in the United States to over 3% in countries like France and Germany (Commission on Workforce Quality and Labour Market Efficiency, 1989). Eliasson has developed estimates for Sweden, including opportunity costs that bring the total investment in human capital per annum "is at least 17% of GNP" (1993, p. 15). For further survey results regarding training expenditures see Bishop (1991).

53. The 1992 *Employment Outlook* points out that: "At present, the individuals who need training most are the least likely to receive it – for example those with lower levels of educational attainment, or low-skilled workers employed in small firms. This suggests the need for other options to provide training. Certificates of achievement can thus be looked at from another viewpoint. A lack of widespread skill standards may inhibit investment in such skills. The Intergovernmental Conference on Further Education and Training pointed out the need for the development and fostering of training markets, and this was re-emphasized in the recent meeting of the Employment, Labour and Social Affairs Committee at the Ministerial level in January 1992. This would entail the development of industry-driven standards, transferability of skills, and certification of competence - all of which will make firms and individuals more certain about the payoffs to training, and thereby lead to increased investment in skills" (OECD, 1992*d*, p. 60).

54. As Eliasson points out: "The labour market is a "market for competence" and the efficiency of this market in assessing and pricing competence very much is the core of the incentive system that stimulates competence development and economic growth" (forthcoming 1996).

55. See for instance the CEDEFOP report on France regarding the importance of joint bodies and the framework role of the State (d'Irbarne and Lemaître, 1987, pp. 83 and 96).

56. Note that this also requires closer consideration of the training and turnover strategies, particularly if the bank loan is contingent on maintaining the competences of the firms' stock of human capital (not the specific individuals but the collective capacity of the workforce as measured by competence assessment and the recorded "value" entered into the financial accounts).

57. If for reasons of public policy (public goods and social returns) there is a desire to lower the risk of human capital investment even further, it would be possible to use public capital funds to subsidize investments by individuals with or without graduated rates of repayment contingent on realization of expected returns and collection through the tax system (Bishop, 1992; Bowen and Krueger, 1993).

58. A standard Canadian accounting text discusses capital leases as follows: "The leasee records a capital lease as both an asset and an obligation in the amount equal to the net present value of the minimum lease payments during the lease term (...). If the capital lease transfers ownership of the asset to the lessee or if the lease contains a bargain purchase option, the asset is amortized over its economic life in the same manner as other assets owned by the lessee. Other capital leases are treated similarly, but the amortization period for the lessee is the period covered by the lease. At the end of the lease term, an amount equal to any residual value to the lessee remains in the leased asset account" (Larsen *et al.,* 1984, p. 855). Of course capital leases are currently only applicable to "tangible" investments. However, with modest innovation in the accounting definitions and significant efforts by public authorities to introduce generally accepted measures of acquired competence there is no inherent reason why this type of instrument could not be applied to human capital assets.

59. Of course this also means that wages could be reduced to reflect the human capital acquired by on-the-job experience (see for example, Becker, 1975).

Annex A

ALLOCATION TO INDIVIDUALS, FIRMS AND GOVERNMENTS, OF COSTS AND BENEFITS OF HUMAN CAPITAL ACQUISITION

Diagrams A.1 and A.2 present rough estimates of financially quantifiable information and the various decision-making methodologies used to make human capital investments. The partial availability of this information on human capital depends upon the degree of credibility of estimates of returns. Presently, when individuals, firms and governments make investments in human capital they are most often doing so on the basis of hopes and expectations regarding the payoff and past work experiences that may have had little to do with what a person actually knows, can do or produces.

Diagram A.1. **Availability of financially quantifiable information, by source of knowledge acquisition**

Source of knowledge acquisition	**Individuals**		**Firms**		**Public Sector**	
	Costs	**Benefits**	**Costs**	**Benefits**	**Costs**	**Benefits**
Compulsory school	Not available.	Not available.	Not available.	Not available.	Available.	Not available.
Post-compulsory higher education	Partially available.	Partially available.	Not available.	Not available.	Available.	Partially available.
Public further education and training	Available.	Partially available.	Not available.	Not available.	Available.	Partially available.
Firm-sponsored training	Available.	Partially available.	Available.	Partially available.	Not available.	Not available.

Source: R. Miller for the OECD.

Diagram A.2. **Methodologies for allocating human capital investment**

Source of knowledge acquisition	Individuals	Firms	Public Sector
Compulsory school	None – no choice.	None – no choice.	Budget process, educational policies and governance systems.
Post-compulsory higher education	Informal: determined by income, culture, family background, aspirations.	Usually informal: human resource/training policies, firm strategy, accounting systems	Budget process, educational policies and governance systems.
Public further education and training	Informal: determined by income, culture, family background, aspirations.	Usually informal: human resource/training policies, firm strategy, accounting systems.	Budget process, educational policies and governance systems.
Firm-sponsored training	Explicit or implicit firm-based contracts, promotion systems, etc.	Human resource/training policies, firm strategy, accounting systems.	Training and labour market policies often with fiscal support.

Source: R. Miller for the OECD.

Annex B

Diagram B.1. **Summary of the characteristics of the Australian model of vocational education and training**

1. It is competence-based and oriented towards outcomes.
2. It is based on life long perspectives with its foundations in the work of schools and with a growing orientation towards lifelong learning in the workforce.
3. Quality, standards and access are central preoccupations so that the model combines quality and opportunity.
4. The focus is on the learner and learning rather than the institution and provider.
5. The system is based on attainment rather than a success/failure dichotomy and thus fosters a culture of achievement.
6. The system supports broad-skilling and broad concepts of competence so that individuals can build on these foundations throughout working life.
7. The increasing range of delivery modes including workplace delivery. this facilitates access and opportunity and adaptation to particular needs.
8. New methods of assessment are being developed, including workplace modes of assessment.
9. The recognition and certification of competence, however acquired, is a central objective.
10. It has growing links to the other sectors of education so as to provide for progression and continuity of learning and the recognition of achievement.
11. The system requires new roles and relationships and co-operative modes of partnership.

Source. Vocational Education Employment and Training Advisory Committee (VEETAC), 1991.

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